NOVEMBER, 1955

American Engineer

IN THIS ISSUE . . .

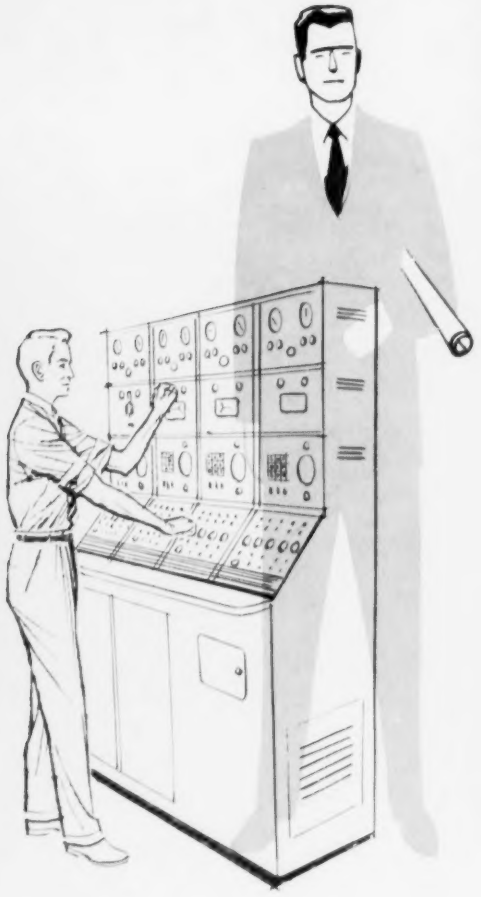
Engineers, Economics and Automation

By

HENRY G. RITER, 3rd,

President, National Association of Manufacturers

Henry G. Riter, 3rd



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NOVEMBER

1955

American Engineer
21st YEAR OF PUBLICATION
1928 – 1955

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—GEN. LESLIE R. GROVES, U.S.A., RET.

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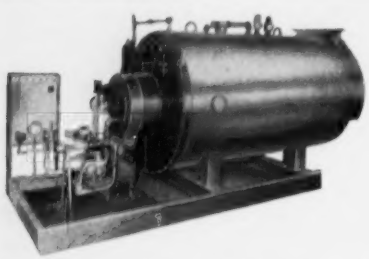

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Letters to the Editor

Gov't. Mapping . . .

Dear Editor:

The September issue of the AE carries an item by Mr. Milton F. Lunch in "From Washington" headed "Reduce Government Mapping Activities."

The article starts with an excerpt from the Hoover Report, in quotations, to the effect that the Government should make use of the services of private aerial mapping companies. All of us know that this is common practice and has been so the past fifteen years.

The point that disturbs me now, and does every time I see it, is the statement that mapping by aerial photography is more economical than extensive ground surveys, with the inference that Government mapping agencies do not use these modern methods. The other statement that work (mapping) done by contract with private organizations costs considerably less than when the Government does it is also not true. A comparison of costs was made in the recent past by the Association of Professional Photogrammetrists. . . .

As a Professional Engineer, I am keenly interested in achieving the same objectives as the Society does collectively, and whether the individual is employed by Government or private industry, his motives should hold him to producing good work with maximum efficiency. If that is accomplished, costs will be low.

NSPE is a young and vigorous Society. Since its articles receive wide distribution in the AE it should exercise extreme care to be completely factual.

I know you all try to do this, so there are no hard feelings on my part. I am expressing my opinion as a member of the NSPE and as a private individual. No official opinion is even remotely intended and none should be inferred.

DANIEL KENNEDY, P. E.,
Rolla, Mo.

►We attempt to report all news and views of interest to professional engineers. Often these reports cover controversial opinions. By the publication of such items of news and views no inference or implication should be drawn with respect to NSPE policy, except where such is clearly stated.—*Editor.*

A Grievance Group? . . .

Dear Editor:

Here we go again on the subject of unionization of engineers. Frankly, I am opposed to it, but when employers of engineers consistently ask for it by imposing inequities and indignities upon us, something needs to be done. That a significant portion of professional engineers are salaried and employed by others is a self-evident fact. Do . . . engineers know that for salaried personnel, a brother profession, the medics, have a grievance committee?

Do we engineers have a similar activity, by which the dignity of the profession might be established for salaried personnel? I use the word "established" instead of "maintained" because, for many salaried engineers, there has never been any dignity in their employment. If we have no grievance committee or its counterpart, why not?

I am sure that establishment of a grievance committee in NSPE with authority to act and recommend, and enough personal integrity and intestinal fortitude to use that authority, would do a lot of good toward circumventing the encroachment of unionism. The autobiographies of only a few engineers, but representative of many, could supply a fruitful field in which such a committee could work. Problems encountered would include inequitable remuneration, subjection to unqualified supervision, unkept commitments with reference to working conditions, use of engineers as strike breakers, subjection to indignities at the hands and tongues of organized craftsmen, inequitable employment contracts, registration of unqualified persons as engineers, and numerous other evil practices.

Well, do we want a profession, or do we want a craft union? Is engineering a profession? The answer is obvious. Let's keep it that way, establish a grievance committee, establish dignity where it doesn't exist, and preserve it where it already is, regardless of whose toes get bruised in the process. . . .

E. M. RAUH, P. E.,
Tulsa, Oklahoma.

Neff Letter . . .

Dear Editor:

A hearty "congratulations" to NSPE President A. C. Neff for his campaign to stimulate interest in mathematics and science courses in high schools. Whether the fault lies in our high schools, the colleges, or our own profession is immaterial, provided someone takes the lead in rectifying the existing conditions.

From my own experience, both my brother and I entered college deficient in the necessary entrance requirements. However, through the years I felt that, since our entrance to college was many years ago (more than I care to remember), this condition had changed and, certainly, close cooperation and coordination existed between colleges and high schools.

The rude awakening came when my wife went back to teach mathematics in the Engineering College at Marquette University. It seemed incredible that a no-credit course in high school mathematics is maintained in the curriculum, and downright amazing that a full class is organized each semester. And this exists among students who are entering engineering. The obvious question is, "How many engineers has the profession lost because their interest was not awakened?" It seems self-evident to me that many potential engineers are left to flounder through life because they were not given the opportunity to find where their talents and interests lie. . . .

CHESTER C. KENNEDY, P. E.,
Milwaukee, Wisc.

EIT Exam . . .

Dear Editor:

I was very pleased to read the remarks of Mr. James H. Smith in the September issue of the AE. Finally somebody had courage to demand a sensible approach to the registration of engineers.

In some states the registration laws seem

(Continued on page 49)

Lockheed diversification in action...

Below: engineers and scientists work on some of the 46 major projects in progress at Lockheed

Operations Research discussion on continental defense

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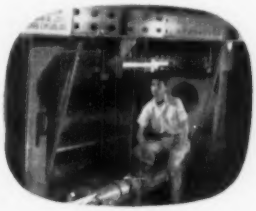

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Structural Engineering openings

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Structures Engineers
Stress Analysts
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Thermodynamics openings

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IBM 701 applied to jet transport flutter problem

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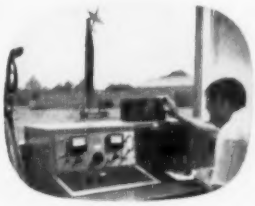

Antenna pattern study on radar search planes

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Flight Test Engineers
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Aerodynamics openings

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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

A. R. Gruehr Heads Brooklyn Tech Dept.

Dr. Anatole R. Gruehr, formerly a senior engineer with the Consolidated Edison Company of New York, has been appointed head of the Department of Economics and History of the Polytechnic Institute of Brooklyn, according to Harry S. Rogers, the school's president.

Dr. Gruehr, who is well known as chairman of NSPE's Public Relations Committee, is also a past president of the New York Chapter of the NYSSPE and has received that organization's Distinguished Service Award.

He began his engineering education in Zurich, Switzerland, and received his bachelor's degree in electrical engineering from the Massachusetts Institute of Technology. Later he received a master's degree in business administration and a doctorate in economics from New York University.

Most recently, Dr. Gruehr, who started on his career with Consolidated Edison in 1926, has been doing comparative economic studies on various phases of the company's operations, including the utilization of gas, electric, and steam energy.

He also belongs to the American Society for Engineering Education, the American Institute of Electrical Engineers, and various other organizations.

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Tau Beta Pi Charters Three New Chapters

Three new chapters were chartered by Tau Beta Pi during the engineering honor society's fiftieth national convention, which was held at Michigan State University, East Lansing, Michigan, October 2-5. The charters were granted to engineering honor societies at the University of Santa Clara, Santa Clara, California; Howard University, Washington, D. C., and the University of Massachusetts, Amherst. The recognition of the new groups increases the number of Tau Beta Pi undergraduate chapters to ninety-nine.

In other action taken during the convention, the delegates again rejected a proposal to admit women to membership in the honor group, although the organization's chapters are still empowered to award special badges to girls who meet the same scholarship and character qualifications required of men for membership. It was also voted to hold the 1956 national meeting at the University of Kansas, Lawrence.

Arrangements for the meeting were under the direction of Bruce I. Macdonald, president of the Michigan Alpha Chapter, and Marvin L. Van Der Ploeg, vice president of the host group. Paul H. Robbins, Tau Beta Pi's director of fellowships and executive director of the National Society of Professional Engineers, served as chairman of the business meetings.

"Why do you engineers have to outdo everyone else!"

J. W. James Nominated For ASHAE Presidency

John W. James, vice president of research for McDonnel & Miller, Inc., Chicago, Illinois, has been nominated for the 1956 presidency of the American Society of Heating and Air-Conditioning Engineers. He is now first vice president of the Society and has held other offices in past years.

Other nominees whose names have been announced by John E. Haines of Minneapolis, current ASHAE president, and the offices for which they have been nominated are: Peter B. Gordon, vice president, Wolff & Munier, Inc., New York—first vice president; Professor Elmer R. Queer, director of engineering research, The Pennsylvania State University—second vice president; and Ralph A. Sherman, assistant director, Battelle Memorial Institute, Columbus, Ohio—treasurer.

Nominees for three-year terms on the Society's Council include two NSPE members—A. B. Algren of Minneapolis, professor of mechanical engineering at the University of Minnesota, and John Everetts, Jr., of Philadelphia, who is with the firm of Charles S. Leopold, Consulting Engineers. Other Council nominees are James N. Livermore of Detroit and John H. Ross of Toronto.

R. T. Sheen to Head Instrument Society

Robert T. Sheen, president of the Milton Roy Company of Philadelphia and a member of NSPE, has been elected to serve as the 1956 president of the Instrument Society of America.

Mr. Sheen, a 1931 chemical engineering graduate of Lehigh University, joined his father in founding the Milton Roy Company in 1937. He also established the Chemical Pump and Equipment Corporation in New York City in 1948 and was co-founder of Chempump Corporation of Philadelphia in 1942. He is also president of the latter firm.

Mr. Sheen is an authority on the subject of water treatment and chemical feed systems. In addition to NSPE and the Pennsylvania SPE, he belongs to the American Chemical Society, the American Institute of Chemical Engineers, the American Management Association, and other organizations.

AIEE Honors Fairman

James F. Fairman, the well-known former vice president of NSPE who served as administrator of the Defense Electric Power Administration in 1951 and 1952, has recently received another honor from the American Institute of Electrical Engineers of which he is also a past president. Mr. Fairman has been elected an honorary member of the AIEE under its constitutional provision which states that honorary members may be chosen by the board of directors "from among those who have rendered acknowledged eminent service to mankind in engineering or other fields."

Mr. Fairman is vice president of the Consolidated Edison Company of New York.

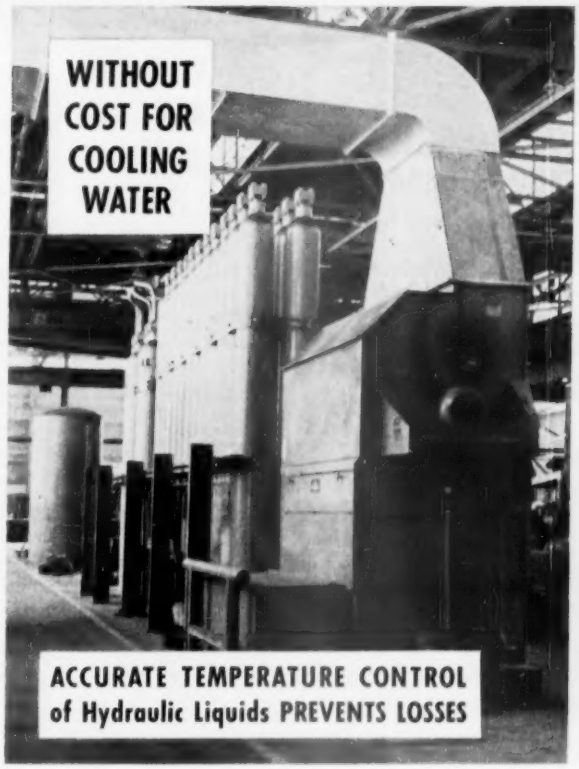
Chiles Is Named To AMA Planning Council

H. E. Chiles, Jr., president of The Western Company, Midland, Texas, and a prominent member of the Texas SPE and NSPE, has been named to the General Management Planning Council of the American Management Association, according to Lawrence A. Appley, AMA president.

Members of the Council serve on a voluntary basis in the planning of conferences, seminars, and other activities in the General Management Division of the AMA. The General Management Division is one of eight functional divisions into which the membership is divided. It is concerned with problems affecting the top administrative levels of business management, including over-all planning, organization structure, executive development, types of controls, business forecasting, and the nature and responsibility of the executive function.

Needles Installed by ASCE

Enoch R. Needles, a senior partner in the New York consulting firm of Howard, Needles, Tammen & Bergendoff, has been installed as president of the American Society of Civil Engineers. The installation took place during the Society's convention held at the Statler Hotel



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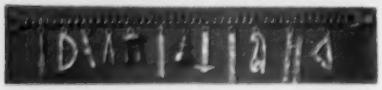

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in New York City, October 24-28.

Mr. Needles, who is also a member of the New York State Society of Professional Engineers and NSPE, succeeded William R. Glidden in the ASCE post.

❁

Senator Flanders Honored By Standards Engineers

Senator Ralph E. Flanders of Vermont, one of the Nation's best-known engineers in public life, was one of five men honored by the Standards Engineers Society at the organization's fourth annual convention held in Hartford, Connecticut, September 29-October 1. Senator Flanders was cited "in recognition of his outstanding contributions in government and industry" and was awarded an honorary fellowship in the Society.

Also honored at the same time for "unusual professional distinction" were: Roger E. Gay, director of cataloging, standardization, and inspection, Office of the Assistant Secretary of Defense (Supply and Logistics), Washington, D. C., on leave as president of the Bristol Brass Corporation, Bristol, Connecticut; Dr. Walter R. G. Baker, vice president and general manager of the Electronics Division, General Electric Company, Syracuse, New York; Harold R. Terhune, manager of the Standards Department, Federal Telecommunications Laboratories, Nutley, New Jersey; and Stanley Zwerling, assistant chief, Tests and Approvals Division, Armed Services Electro-Standards Agency, Fort Monmouth, New Jersey.

❁

Dr. Dunlap Teaching At M.I.T. for Year

The appointment of Dr. G. Wesley Dunlap, a prominent General Electric Company engineer, as a visiting professor at the Massachusetts Institute of Technology has been announced by Dean C. Richard Soderberg of the School of Engineering.

❁

Applications Being Accepted for NSF Fellowships

Applications are now being accepted from college seniors and graduate science students for the more than 750 fellowship awards which will be made available during the 1956-57 academic year under the National Science Foundation's Fifth Annual Graduate Fellowship Program, according to Dr. Alan T. Waterman, NSF director.

Applications may be obtained from the Fellowship Office, National Research Council, Washington 25, D. C. The closing dates for receipt of applications are December 19, 1955, for postdoctoral applicants, and January 3, 1956, for graduate students working toward advanced degrees in science. The award selections will be announced on March 15, 1956.

❁

Nuclear Congress Plans Announced by EJC

Engineers Joint Council has announced plans for the first national Nuclear Engineering and Science Congress, for which it is serving as coordinating organization in cooperation with various engineering and scientific societies, private enterprise and the Government. The Congress is scheduled for Cleveland, Ohio, from December 12 through December 16. Meetings will be held at the Cleveland Municipal Auditorium.

In addition to the technical meetings there will be an Atomic Exposition, which will open December 10 and run through December 16. The exhibition will be sponsored by the American Institute of Chemical Engineers.

❁

C. E. Williams Becomes Honorary ASME Member

Clyde Elmer Williams, president of Battelle Memorial Institute, Columbus, Ohio, and a member of the OSPE and the National Society, is one of seven men who have been designated for honorary membership in The American Society of Mechanical Engineers. The highest honor the ASME can bestow, the honorary membership will be accorded to Mr. Williams during the Society's diamond jubilee meeting in Chicago this month.

Others receiving the same honor are: Joseph Bradley Armitage, vice president in charge of engineering, Kearney & Trecker Corporation, Milwaukee, Wisconsin; James H. Doolittle, vice president and member of the executive committee, Shell Oil Company, New York, N. Y.; Samuel

Broadus Earle, dean, School of Engineering, and director, Engineering Experiment Station, Clemson College, Clemson, South Carolina; Simes Thurston Hoyt, consulting engineer, Castle & Cooke, Ltd., Honolulu, Hawaii; Carl George Arthur Rosen, consulting engineer, Caterpillar Tractor Company, Peoria, Illinois; and Philip Sporn, president, American Gas & Electric Company, New York, N. Y.

❁

Fritz Engineering Lab Is Dedicated

The new Fritz Engineering Laboratory at Lehigh University, Bethlehem, Pennsylvania, was dedicated on October 14 before an audience of distinguished engineers and scientists. Dr. Allen V. Astin, director of the National Bureau of Standards gave the dedicatory address.

The new laboratory is particularly unique because it contains the world's largest tension-compression vertical testing machine capable of applying both tensional and compressional loads up to five million pounds. The machine itself and its accessories weigh approximately 925,000 pounds.

❁

Killian on Prize Board

Dr. James R. Killian, Jr., president of the Massachusetts Institute of Technology, has been named to serve as chairman of the Organization and Planning Committee of the Atoms for Peace Awards, it has been announced by Henry Ford II. The headquarters of the new institution which will administer the project will be at M.I.T.

The award program, first announced by Lewis L. Strauss, chairman of the Atomic Energy Commission, in Geneva on August 8, was established as a memorial to Henry Ford and Edsel B. Ford by a Ford Motor Company appropriation of one million dollars. This will provide $100,000 annually for ten years to be spent in helping to create incentives for the world's scientists, inventors, and engineers—without regard for nationality or political belief—toward finding new ways in which atomic energy science can be developed and used for the benefit of mankind.

The Ford Company has proposed, according to Henry Ford II, that the annual award carry an honorarium of $75,000, in addition to a suitable medal, for the individual or group adjudged to have made the greatest contribution to peaceful atomic progress during the year. It has also been recommended that, if during any year no candidates of sufficient merit are found, the sum for that year should be spent for scholarships and fellowships most likely to contribute to the advancement of the science of peaceful application of atomic energy.

❁

Volume of Poems Published by Steinman

Dr. David B. Steinman, world-famous bridge engineer and the first president of the National Society of Professional Engineers, has added another to the list of books that he has authored. This time it is a collection of poems he has written.

Entitled *I Built a Bridge, and Other Poems*, the book is published by The Davidson Press of New York and

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features an introduction by the writer, Elias Lieberman. A number of the poems included were originally published in the AMERICAN ENGINEER.

Neff To Speak In Oregon

Allison C. Neff, president of NSPE, will be one of the featured speakers during the forthcoming 1955 convention of the Professional Engineers of Oregon, scheduled for the Multnomah Hotel in Portland, November 18-19. The subject chosen by Mr. Neff for his address, which will be delivered during a luncheon on Friday, the 18th, is "The Legislative Problems in Developing Professional Standing for the Engineer."

During the Friday afternoon session of the convention, Mr. Neff will also participate in a panel discussion that will deal with various concerns of professional men. Other participants in the panel, who will also give individual addresses during the day, will be: Arthur W. Priaulx of the West Coast Lumberman's Association; John Holloway, executive secretary, Oregon State Bar Association; E. L. Chandler, assistant secretary, American Society of Civil Engineers, representing Engineers' Joint Council; and R. John Fitzgibbon, a member of the Multnomah County Medical Association. Howard Arnett of the PEO will act as moderator.

"Can't that crew wait until the rest catch up?"

Wisconsin Law Clarified On Engineering Practice

The Wisconsin Legislature has approved an amendment to the engineering and architectural law which clarifies the right of engineers to design all types of buildings.

The background of the case, as reported by the Wisconsin SPE, was that for many years, professional engineers in the state, designed both industrial and non-industrial buildings. Within the past year, however, the registration board, based on an interpretation of the law, questioned the right of engineers to prepare plans for non-industrial buildings. An inter-professional relations committee of engineers and architects met on various occasions in an effort to resolve the existing conflict, but agreement was not reached.

In its request to the legislature to amend the law to remove the cloud on the engineers' rights, the Wisconsin SPE said that the ability to design buildings and draw plans does not depend upon whether the individual is an architect or an engineer. "It depends rather upon the background and experience of the individual in each of the professions." The Society brief said that this premise is recognized in the law "by reason of the fact that professional engineers can design and supervise the construction of industrial buildings. An industrial building as a place of employment certainly presents a greater complexity of problems than does a supermarket. Yet the engineer by law may design the industrial building but not the supermarket. Such inequity must be corrected by the legislature."

The amendment, backed by WSPE and other engineering societies in the state, removed certain words from the present law which had caused the interpretation leading to the problem. The backers of the amendment said it was in conformity with the basic principles of the code of interprofessional practice between engineers and architects. "It places no restrictions on the economic opportunity of the practicing engineer. It assumes that the public shall have absolute choice. It relies upon the ethics of the individual to do that which he is qualified to do." The engineers objected to a counter-proposal which they said would classify the engineering profession by allowing "structural engineers" to design non-industrial buildings. They said this did not recognize engineering as a single profession.

Supreme Court Denies Wage-Hour Case Hearing

On Monday, October 24th, the Supreme Court denied the petition for a review of the Eighth Circuit Court decision holding Kenneth R. Brown, a consulting engineer of Des Moines, Iowa, subject to the Wage-Hour Law. As usual, the Supreme Court did not give any reason for its refusal to review the case. The Supreme Court action does not mean that it necessarily agrees with the Circuit Court opinion. However, the action leaves the Circuit Court decision binding on the lower courts in Iowa, Missouri, Minnesota, Arkansas, Nebraska, North Dakota, and South Dakota.

A new request for a Supreme Court decision can be filed at a later date if the Court of Appeals in another circuit issues a ruling contrary to the Eighth Circuit decision. NSPE had participated in the request for a Supreme Court review as a "friend of the court." (AE, Oct., 1955)

Headquarters Building Progress Continues

Moving day will not be too far away for the Washington staff of the National Society of Professional Engineers if progress on the new headquarters building continues at its present rate. A January moving date is now anticipated. This will bring the Washington staff, now located in two separate offices because of space problems, into one central office for the first time in nearly two years.

The opportunity is still available for members of the National Society to obtain a financial interest in their own Washington headquarters building by the purchase of Building Fund Participation Certificates. Full information on the certificates may be obtained from the Washington office.

American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-FIVE NUMBER ELEVEN

Are We Entering the Second Industrial Revolution?

by HENRY G. RITER, 3rd

President, National Association of Manufacturers

Engineers, Economics, and AUTOMATION

JUST about a century ago, Henry Ward Beecher made a very famous statement. "A tool," he said, "is but the extension of a man's hand, and a machine is but a complex tool. And he that invents a machine augments the power of a man and the well-being of mankind."

This is an axiom to which I wholeheartedly subscribe. It is a theory that has been proved by the test of history. It is indeed fundamental to the growth and development of the United States. And we shall, I am sure, become even more acutely aware of its validity as we progress into the future, adapting and making increasingly productive use of the new concept of the machine now commonly called *automation*.

The word *automation* itself has been variously defined and its delineations have been vastly extended since it was first introduced into the language about ten years ago so that to the public mind it is now applicable to the entire new technology of control and communication. For practical purposes, however, we seem to have two major divisions or phases of this technology at the present: first, the manufacturing process in which automation means the automatic handling of parts between successive stages of production, or the control of machines by other machines in a continuous and integrated manufacturing operation; and, secondly, the so-called "giant brain" processes through which vast amounts of information are stored and held available and tremendous computations are made by machine. In connection with this second phase in particular, we also are hearing the term *cybernetics* used frequently.

Of course, automation does not represent an overnight shift, though the trend is accelerating. It has been coming for a long, long time—actually since the very first effective manufacturing machine was invented at the beginning of what is now being called the *First* Industrial Revolution, with the implication that automation is the *Second* Industrial Revolution. Many of the processes are older than the name. And we are not going to wake up tomorrow morning to a world that is completely run by pushbuttons.

Nevertheless, the pace is rapid. During the past ten years American industry has spent roughly $300 billion for new plants and equipment, with a large percentage of this figure going for the devices of automation; and it is expected that in the next five years another $200 billion will be similarly spent.

THE engineer is, of course, pretty much the key man in this picture. He is the man who has been speeding

up the production processes with the new techniques. He, with his partners from the other sciences, has been responsible for the wonder machines that literally make it impossible for an important file of data to be lost.

And the job that he has—planning, designing, supervising, refining—is going to get bigger. It is going to have to get bigger, for one reason, because automation is going to be necessary as an answer to the demands of the national economy. Our population is increasing rapidly. In the next ten years, we may expect it to rise by about 30 million people. But because our available work force increases at a much slower rate proportionately to the net population, we are going to need those automatic means of producing the goods and services that the growing population requires.

That is the answer to those who wail over the prospects of what they call "technological unemployment," to those who would make a Frankenstein of a development that can be a vital steppingstone in economic expansion.

Another answer was given the CIO by its president, the late Philip Murray, who said in 1951, "I do not know of a single, solitary instance where a great technological gain has taken place in the United States of America that it has actually thrown people out of work. I do not know of it, I am not aware of it, because the industrial revolution that has taken place in the United States in the past 25 years has brought into the employment field an additional 20 million people."

Of course, this is not to say that there will be no shifts at all in the work force. There will undoubtedly be shifts, as there always are when new methods are introduced; and some jobs will admittedly be replaced by the machines as jobs are being replaced every day for one reason or another. The important thing to remember, however, is that there will be many *new* jobs.

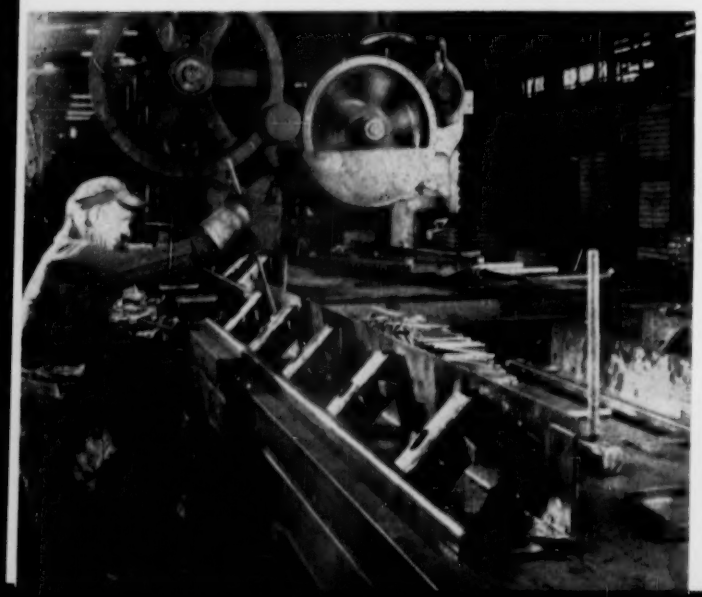
Automation itself, for instance, is the basis for a complete new industry—the manufacture of its equipment and components. At the present time there are more than a thousand United States companies engaged in this new industry either in whole or in part, and their aggregate output last year totalled more than $3 billion. Then, too, the companies that are using automation in their operations report no telltale drops in the numbers of their employees. General Motors, for example, points out that it has increased its work force by some 200,000 people while at the same time adding new, modern equipment during the past few years.

THE jobs are different perhaps, but they are there. For one thing the machines of automation must be serviced and someone must still ultimately control them. The giant computers must quite literally be staffed with computer experts. As Mr. Benjamin F. Fairless has observed in a recent speech: "Over the centuries man has accomplished an amazing industrial miracle. He has surrounded himself with luxuries, and greatly lengthened his hours of leisure; but no machine that he ever devised has made us humans obsolete."

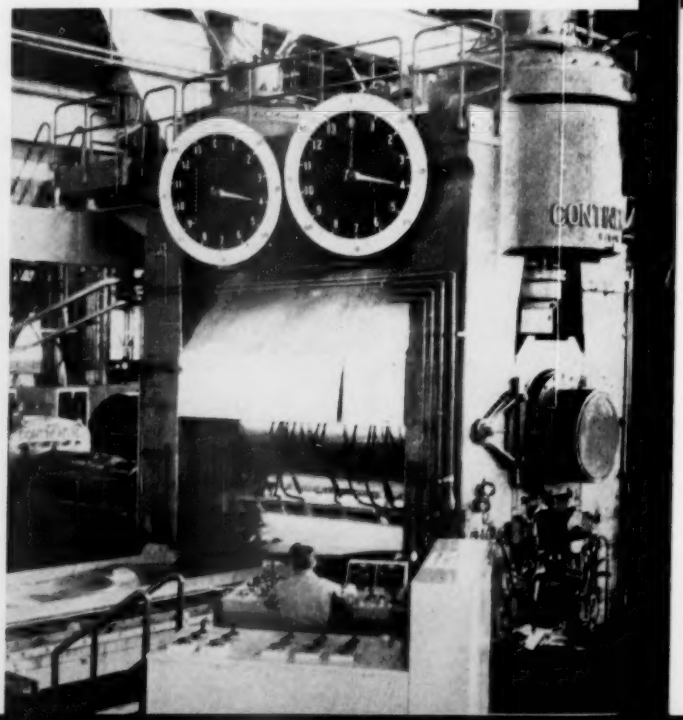
We forget too often, I am afraid, that the new machines still can do only what they are programmed to do. In the final analysis they cannot replace brain power. But we, on the other hand, can train and improve our brain power, and that is exactly what automation is going to force us to do. It is going to mean the upgrading and refining of many positions from the ordinary worker in the factory through the foremen and supervisors right to the top engineers and managers. Skills, knowledge, and judgment are going to have to be improved all along the line, and I do not believe that there is any organization that is more acutely aware of this than the National Association of Manufacturers.

In many of our member industries we can see remarkable opportunities ahead for the engineer who becomes a specialist in automation techniques. And back of this key specialization there will have to be more intensive training, quite probably more intensive on-the-job training. Within the automation field there will be room for engineers of many basic specialties; but because their activities will mesh together in a more complex way than ever before, they will have to develop a profound sense of teamwork and they will need to be communication-conscious. To a very great extent, while being specialists themselves, they will need to understand each others' jobs more thoroughly than ever before to achieve appropriate coordinated action.

Are we approaching an era in which the presence of a plant workman will be an oddity? Has the day arrived when the push-button will take over?



Here one man controls the world's largest extrusion press at the Lafayette, Ind., works of the Aluminum Company of America.



Automation is also going to create more opportunities for more and for better managers. There is going to be a greater need for men of judgment who can make important decisions and make them quickly because there will be less time for mulling over problems with the economics of automation demanding incisive action. There will be even more need for the manager, too, to grasp "the whole picture" at a glance. And parallel to this, we will have to come down to some pretty precise and effective long-range planning at the managerial level to assure the economic worthiness of the automation operation. Industry is going to have to pay a lot more attention to operations research studies, in which, incidentally, engineers play no small part.

It is also fairly safe to predict that automation is going to mean in many cases a greater concentration of personnel at the periphery of a company rather than at the center of the organization. That means that there will be more people needed for meeting and dealing with the public, working in the sales and service areas of a business in order to maintain uniform markets and optimum plant utilization.

Meet the "electronic office"! From this operator's console, supervision is maintained over millions of commercial data processing operations.

Then in the plant itself there will be an absolute necessity for greatly expanded preventive maintenance programs. I have already pointed out that the machines of automation will have to be serviced, but such servicing cannot wait until there is a breakdown. The economics of the automation system will demand that the machines and devices be checked, oiled, and so forth, on a very definite schedule and that perishable parts are replaced *before* they reach the point of causing a complete stoppage in the costly manufacturing operation.

The production workers themselves will have to have greater technical knowledge, higher degrees of skill, and in some cases they will have to acquire new skills. This points up the need first for better basic educational backgrounds, and then for improved in-plant training which will be necessary to assist the workers in adjusting to the new manufacturing techniques and methods involved.

There is no denying that management must take very seriously the responsibility of planning intelligently so that workers are not needlessly displaced by a switch to automation, so that they have maximum opportunity to reorient themselves in line with the new techniques and procedures, and so that any necessary redistribution of the labor force is effectively accomplished. And that is only common sense, because after all a tremendous dislocation of labor, any extensive unemployment situation, resulting from a large-scale change to automation would defeat the very purpose of the change since it would mean a serious depression in consumer purchasing power. In a nutshell it would mean that the products of automation would go unsold thus making the process itself uneconomical.

Planning and studying, looking intelligently ahead,

This automatic machine at the Gordon Lubricating Company is used for packaging finished oil in quart cans.

are, therefore, going to be basic to the future of automation. A company will have to be very, very certain that the introduction of automation will be to its benefit before it makes the expensive switch. And not every industry will find that this is expedient. So far the new technology has made its greatest advances in the automotive industry. There are many other industries, such as chemical production, oil refining, and others where the continuous-flow production principle is readily acceptable, where signifiant strides may be looked for. But there are other businesses where the principles of automation may be introduced only in part. In many instances, too, automation may simply remain in the office with the giant brains taking care of information handling and accounting procedures. In other cases, because of the highly individualistic nature of a product, the small size of the firm, space requirements, the personal service factor necessary to customer satisfaction, and so on, there will be little significant contribution to be expected from automation.

There are a great many questions that will have to

The author says that automation can mean better products, better jobs, more leisure.

be asked and answered within a firm before a decision to go all-out for automation is reached. Some of them are as follows:

Is automation going to be the best thing for us economically in the long run?

Will the changeover necessitate the redesign of our product? And can we, or do we want to do this?

Will increased standardization of our products (and automation does mean a greater degree of standardization in many instances) meet with the approval of our known customers? Or might we first find a drop in our market that would be too difficult to overcome?

Are we reasonably certain that the demand for our product will make constant and continuing production profitable? (A complete shutdown of an automatized plant made necessary because the market cannot absorb an overload of its products can be very expensive.)

What about our competitive situation? Do we need automation to meet our competition? Have other firms in our field changed to it successfully? Have there been any failures about which we should be alert?

How will it affect our administrative organization? Do we have a sufficiently flexible management to insure proper and effective supervision and coordination of the new processes?

What will our personnel problem be? Do we have enough trained and competent people on our staff now to handle the change? Will we need more engineers? And will we be able to get them? And what about our production workers? What shifts and changes will be necessary in that area? Will we have to develop an in-plant training program?

Can our plant layout take the change? Or will we need to expand our working space to make room for the automation devices?

Is our volume of business, required record-keeping, accounting, and so on, sufficient so that we ought to install a data-processing machine or giant computer? Or would we be better off merely renting the services of one of the giant brains at the computer centers that are being established?

Automation is not something that can be introduced capriciously into an industry. There will conceivably be cases, of course, where the changeover may be something of a calculated risk, but that is the way the American industrial system has always operated. Often you have to take a chance to succeed—not a blind chance, however, but a step that has been studied and weighed carefully. It is foolish to fear progress; yet progress has often been feared by the shortsighted.

ACTUALLY automation, as it is being introduced into our businesses today, represents a further refinement of that old-fashioned characteristic we have all boasted highly—"American know-how." If we apply it intelligently, there is no doubt that we will have another wider door into a productive and dynamic future. It can mean better products, better jobs, more leisure.

It will undoubtedly bring about a considerable change in the character of our work force with demands for more highly skilled people and more professional people. But this is not an area for antagonism or for stalemate. It is an area for intelligent cooperation among all segments of working America.

Automation in its various phases and forms is definitely here to stay. It is up to us to make the most of it.—***End.***

About the Author . . .

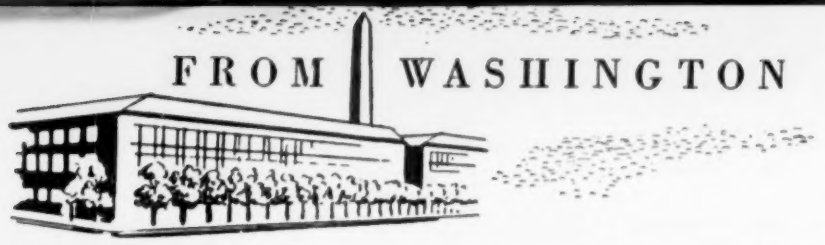
Mr. Riter

Henry G. Riter, 3rd, the 1955 president of the National Association of Manufacturers, has been prominently identified with industry and investment banking for many years. He is president of Thomas A. Edison, Inc., West Orange, New Jersey, chairman of the board of the Copperweld Steel Company, and a limited partner in Riter & Company, an investment firm which he organized in 1933.

Since he became president of Thomas A. Edison in 1950, many new products have been developed and introduced by the firm. Among them are the remote-control, multiple-station dictating system, known as Televoice, and the Edison VP Voicewriter. The firm also manufactures batteries, aeronautical instruments, fire detection equipment, precision electronic test equipment, medical gases, and juvenile furniture.

Mr. Riter is also vice president, director, and a member of the executive committee of the New Jersey State Chamber of Commerce, and he has held offices in various investment organizations, including the Investment Bankers Association of America and the National Association of Security Dealers.

He makes his home in Montclair, New Jersey.



FROM WASHINGTON

By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

DOMESTIC TECHNICAL ASSISTANCE PROGRAM

President Eisenhower's economic advisers have secured his "strong approval" for a new domestic legislative proposal which should prove of more than usual interest to professional engineers. The program, which is designed to aid the nation's chronically depressed areas, is being described as a domestic "Point Four" program, the terminology coming from the fourth point of former President Truman's program in his 1949 inaugural message which led to the establishment of the technical assistance program for foreign underdeveloped nations.

As outlined in broad terms by Dr. Arthur F. Burns, Chairman of the Council of Economic Advisers, and Gabriel Hauge, the President's personal economic adviser, following a conference with the President in his Denver hospital room, the program will be designed to help depressed areas share in the general prosperity through a cooperative Federal-State-Local operation. The economic experts mentioned as the type of areas they have in mind New England textile centers and Pennsylvania and West Virginia regions which rely on coal mining as the basic industry.

Under the proposal, which will be submitted to Congress next January, a new Federal agency will be established, probably within the Department of Labor or the Department of Commerce. The agency would be charged with an attempt to reclaim industrial communities that "in spite of the good times we have been having, still have persistent unemployment and depression," Dr. Burns said. Such pockets of depression have existed historically, even when the country was booming, Dr. Burns added, and the new program will be the first attempt by the Federal Government to deal with the problem areas on a planned scale.

Of particular interest to professional engineers was the explanation that the agency will have the function of rendering technical assistance to the depressed communities. The local communities' economic troubles are to be appraised and surveyed to discover their "economic potential," he said. "This program will make sure that communities get needed technical assistance to develop programs for their own economic development." Another aspect of the program is intended to be Federal loans where needed for industrial development projects worked out on a local level and approved by the state industrial boards. The Federal loans would be made only on a participating basis, with the state, the community and private enterprise assisting financia ly. Dr. Burns said that the Federal funds would be given to "stimulate" growth and development in the depressed areas, but the program would put "a very definite accent on private enterprise."

PROPOSED COMPROMISE ON OUTSIDE TVA ENGINEERING

The recently-published complete hearing on the TVA financing legislation, which contains proposed authority for TVA to provide engineering and construction services to non-TVA, non-Federal agencies and persons, indicates that a possible compromise may be offered next year to meet NSPE's objections.

Following a lengthy discussion between several members of the Senate Public Works Subcommittee and the TVA witnesses over the NSPE protest against the broad grant of authority for TVA to provide engineering and construction services at public expense (AE, Sept., 1955), Senator Kerr of Oklahoma, Chairman of the Subcommittee, brought up the possible compromise. This would take the form of eliminating the words, "or for the purchase of the output thereof," from the language defining the instances in which TVA could provide the engineering work. With these words eliminated, the authorization would read:

> "In connection with the construction of a generating plant or other facilities under an agreement providing for lease or purchase of said facilities or any interest therein by or

(Please turn the page)

(Continued from previous page)

> on behalf of the Corporation (TVA), the Corporation may convey in the name of the United States by deed, lease, or otherwise, any real property in its possession or control, may perform engineering and construction work and other services, and may enter into any necessary contractual arrangements."

The effect of the deletion would be to eliminate the engineering authority where the only arrangement between TVA and the outside interest was for TVA to purchase all or part of the electrical energy generated by the outside facility.

Sen. Kerr of Oklahoma

The TVA witnesses did not specifically state whether the proposed compromise would be acceptable, but it was stated that "that kind of integration arrangement—one soley for the purchase of the power—would be probably the least likely of the three that are mentioned here to be one requiring any engineering services by TVA." One TVA witness added that the agency "might be handicapped by the omission of the words," but "such a situation would probably not arise." The suggestion was not formally offered as an amendment to the bill, and no action was taken. The exchange between Senator Kerr and the TVA witness does infer, however, that a formal amendment may be offered when consideration of the bill is resumed next year.

Prior to the exchange on this point, Senator Roman L. Hruska of Nebraska pressed the TVA witnesses for a justification of the outside engineering authority sought in the bill. After the TVA witness said that TVA would "contemplate providing only those engineering services that were mutually desirable and necessary to permit the right kind of a plant to be built on the right schedule and in an economical way," Senator Hruska responded:

> "Of course, that goes to the root, does it not, of the complaint or viewpoint of the National Society of Professional Engineers. When you say you are concerned with the cost of such a plant and that it be built to specification, and so on, and that no one else can do it except your staff and your engineers, that anyone else in the profession including any member of this national society, would not be able to achieve those things, then you are arrogating to your engineering staff something that is very superior to anybody else in the world, and they do not believe in that doctrine, I do not believe."

Senator Hruska then turned to the NSPE reference to compliance with the state engineering registration laws, which had noted that TVA as a governmental agency was not licensed to offer or perform professional engineering services under the state engineering registration laws. The TVA witness replied: " . . . I do not think it would be different in principle from the use of our engineers on our own construction projects. We would have the same kind of an interest in the construction of one of these plants under a lease-purchase agreement that we would if we financed it ourselves. As you know, the engineers on Federal projects are not required to be licensed by the State, although many of TVA's engineers, in fact, are licensed. The Federal Government is competent to set up its own standards, and the interest of TVA, here, would be just about as direct."

To this the Nebraska Senator replied: "No, not quite, because here, you are offering those services to others. I presume one can practice law for himself and represent himself in court as often as he wants to, but when he undertakes to do it for others, then another field is entered into, you see. Is not the same principle applicable here? You can do it for yourself, and the Federal Government, as a superior entity to State laws can do it for itself, but where you undertake to do it for others, is not a different situation presented?" The TVA witness retorted: "Well, Senator Hruska, as I tried to make clear and perhaps did not succeed, we would only do it where the TVA had a financial stake itself." Senator Hruska again pressed his point, however, stating: "That again is evading the question. When you are buying the output of a plant and use that as a vehicle for saying that you are sufficiently interested in it so you can override and, in effect, nullify State laws which govern engineers and the practice of engineering, then you see you are getting on tenuous ground, it seems to me." Later, he added: "You see, that is what they are talking about here. They have a profession and they have members who are practicing that profession, and you say the municipalities have no engineering staff. Therefore, you have to provide it. These people (NSPE) say, 'No; there are independent engineers and engineering firms, private engineers, who are available for that purpose.' "

P. E.'s At Work . . .

Transit Problems and the Engineer

By Virgil E. Gunlock, P. E.,

Chairman of the Transit Board, Chicago Transit Authority, and Vice President, NSPE

THE engineer's hand, skill, and knowledge are as evident and vitally necessary in every phase of urban transit as they are in all progressively managed industries.

From the planning, design, construction, and operation of a subway, rapid transit expressway line, or other major facility, at a cost of many millions of dollars, to the administering of routine clerical and maintenance procedures, competent adequate engineering is essential to effective installation and satisfactory performance.

Local transit problems and their solution in Chicago, as encountered by the Chicago Transit Authority in 1947, and the progress in solving these problems, provide an outstanding illustration of engineering achievement.

CTA was conceived by an engineer, who was also its first chairman. It is significant that all three chairmen of the Chicago Transit Board have had wide engineering experience.

Organization of the Authority, a municipal corporation, came after many years of effort to establish a unified, comprehensive, local transit system in Chicago. During those years, a number of different attempts were made to consolidate the several companies then existing into one corporation with private ownership and management. Despite capable and extensive engineering planning, all of these efforts failed of accomplishment because private capital was not available for necessary financing. Much of the physical system recommended in the later of these engineering plans was included in CTA's program.

CTA was incorporated in 1945. It issued revenue bonds with which it purchased for $87,000,000 the street railway and bus lines formerly operated by Chicago Surface Lines, and the rail rapid transit elevated and subway lines, formerly the Chicago Rapid Transit Company. It started operations on October 1, 1947. These two properties had been in bankruptcy or receivership for twenty years, and presented a gigantic challenge. Most of the passenger equipment, as well as shop and other maintenance facilities, was obsolete or not at all adaptable to modern local transit service. In addition, many lines of the two properties were highly competitive, which also contributed heavily to wasteful operation.

Another major factor in the Authority's problems was the enormous shift from local transit riding to the use of private automobiles which began throughout the nation shortly after World War II. This difficult situation has been sharply accentuated by the rapid increase in personnel and material expenses over these recent years. Altogether, it is evident that CTA's management and engineers faced a most difficult local as well as national situation in which the urban transit industry was and still is struggling for its life.

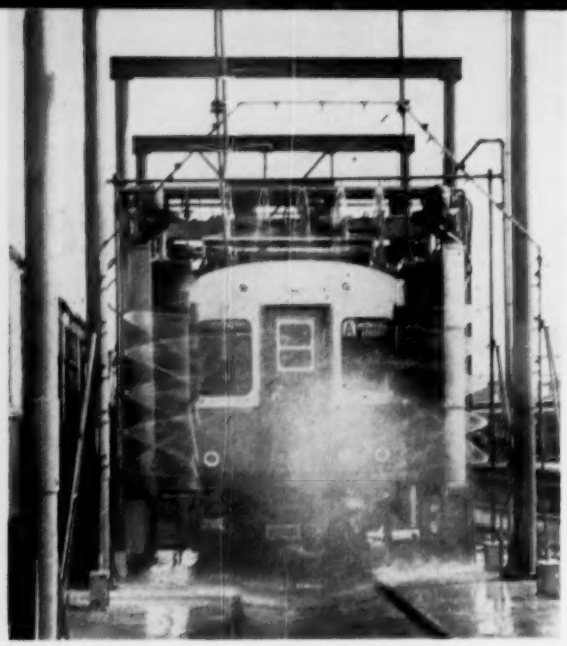
Despite the discouraging aspects in its first decade of existence, CTA has well on its way toward completion probably the outstanding local transit modernization program in all the nation's history. This accomplishment has been possible principally through the application of engineering science.

The old red streetcar is gone, and in its place are modern flexible motor and trolley buses. CTA now operates only three streetcar lines of nearly 1900 miles of surface routes, and more than 3500 surface units including properties of Chicago Motor Coach Company acquired in 1952 that provide service by modern passenger equipment.

Modernization of the "L"-Subway passenger equipment is also nearing completion, with only 225 additional cars needed to serve the entire system.

OTHER major improvements include scientific planning and the installation of modern machinery in shops and garages, modern methods and equipment for Way and Structure maintenance and snow and ice removal, and

A conductor at the Milwaukee Avenue subway terminal receives green starting light signal flashed on by automatic train dispatcher from central office.



◄ **More special equipment, thanks to engineering! On the North-South route, cars are washed once a week by a special automatic, electric, motor-powered car washer that does the job in three minutes.**

the coordination of the three properties, including administrative offices, into one effective corporate agency. In this program, CTA has committed and largely paid more than $100,000,000, and has given Chicago for the first time in its history a unified transit system providing service within three blocks of virtually 100 per cent of the population, on which people may travel between practically any two points in the city and to certain suburbs for one fare.

Underlying all these accomplishments are the insight and imagination of the engineer. Nearly all branches of engineering have made contributions to this program—mechanical, electrical, civil, industrial, chemical, and architectural.

The selection of types of passenger equipment entails intensive engineering studies. Included among these are street and traffic conditions, viaducts subject to flooding, community restrictions, etc., which may determine the choice of completely flexible motor buses or electric powered units. Another important factor is diversification of power source. CTA now operates 709 diesel fueled buses, 804 gasoline fueled buses, 1051 propane (liquefied gas) fueled buses, 599 trolley buses, and 410 streetcars, as well as 1275 electric "L"-Subway cars. The fleet of propane buses, the largest on one property in the world, represents a major engineering achievement. This fuel was formerly a slightly used by-product of the petroleum industry, and was a non-strategic material during the war period. In addition to operating and maintenance economies available with its use, propane fueled engines do not emit offensive odors.

Other items requiring competent engineering skill in the selection of passenger equipment are size of unit, design and arrangement of seating, ventilation, fenestration, lighting, door construction, selection of materials to assure durability and light weight and safety. In the design of many of these items, CTA, equipment manufacturers, and engineering associations collaborate to develop the most modern ideas.

Chicago's "L"-Subway service has been made the most rapid in its history with the addition of new cars, the installation of express stop service, and abandonment of lightly used stations. CTA's engineers developed and installed two-man train controls on many "L"-Subway cars formerly requiring one man for each car of a train. Other modern engineering devices in CTA "L"-Subway operations are signal systems and centrally controlled line supervision, with which the line supervisor in the General Office is continuously informed of the exact location on the system of all trains, and has effective control of these operations by means of telephonic communication.

▼ **Heart of the CTA line supervision control system is the central line supervisor's office in the Merchandise Mart. From this location, the movement of all rapid transit trains operating on the system can be followed all along the routes by means of train detectors placed at key points about every two miles along the lines.**

An ingenious engineering application is CTA's conversion of P.C.C. streetcars into rapid transit cars. Early in the modernization program, a predecessor company purchased 600 of these modern streetcars, a number of which under present conditions would have operated in service that could be supplied more effectively by modern buses. Under the conversion program, 270 of these streetcars were sold to an equipment manufacturer for rebuilding into new streamlined rapid transit cars, thereby making good use of the remaining service life of the streetcars as well as providing new and much needed rapid transit cars, all at a saving of $20,000 per car.

The planning of transit service in a large urban area requires thorough engineering analyses and investigations. Routings are so established as to provide service within a reasonable distance of all areas, and sufficient service to accommodate riding needs without costly duplications or over-servicing. With present day mass movement toward decentralization and the establishment of new commercial centers in many communities, and the lower density of population in these areas, the operation of transit service requires the most expert planning and operation to avoid financial losses.

Scheduling of service on transit lines (123 surface lines and 10 "L"-Subway lines on CTA) is another vitally important technical application. Extensive observations are necessary by personnel on the streets to gather statistical data on riding volume, speeds of vehicular movements and other related data. This statistical material is thoroughly analyzed by office schedule personnel, and forms the basic information for scheduling service. Different schedules to adapt service to seasonal conditions.

A line supervisor adjusts the schedule tape which ► operates automatic terminal at Congress and LaSalle streets. This initiates the proper alignment of track switches and sets up the mechanism for automatic dispatching of trains in and out of the terminal.

usually four or five per year, are prepared and distributed to operating departments for all lines.

A TRANSIT procedure in a large metropolitan area that might appear simple is the handling and accounting for cash collected. The CTA receives approximately 6½ tons of coins and $175,000 in bills on an average weekday totaling approximately $400,000. Passengers place the coins in fare boxes and turnstiles, or hand them to agents. The fare boxes, turnstiles, and mechanical facilities used by "L"-Subway agents are all equipped with engineering devices designed for control, counting, and efficient handling of money received. Bus and streetcar operators turn in cash received to receivers at their respective stations where it is counted by special machinery and bagged for delivery to the Federal Reserve Bank by armored car. Regular collections are made from "L"-Subway agents' receipts which also are transferred to the bank.

CTA's safety engineers and other personnel are on the job continually in a progressive accident prevention program. Despite this comprehensive effort, CTA's annual expense for accidents is $7,500,000.

With an annual expenditure for material and supplies, repair parts, motor fuel, and other purchases including services, totaling more than $20,000,000, it is important that purchasing and materials and supplies procedures be thorough and adequate. Under legislative requirements, the CTA must advertise for bids and award contracts on the basis of bids received in its purchases. To provide information necessary for these procedures, CTA's engineers prepare complete and detailed specifications to which bidders are required to conform. Handling and control of $6,000,000 of materials and supplies and motor fuel inventory require industrial engineering of a high order.

CTA's annual bill for electric power is nearly $6,000,000, and assuring economy in energy used and stability of performance is an important engineering project.

Local transit riding during recent years has declined drastically throughout the nation (CTA's revenue passengers during 1954 were 44 per cent below 1946). Automobile registration in Chicago during 1954 was 71 per cent above 1946. Despite extensive decentralization movements, vehicular speeds in the central commercial districts of large cities are in many cases even slower than those in the "horse and buggy" days.

Engineers estimate that traffic delays cost CTA riders $5,000,000 annually in wages paid to local transit operators; and that the annual loss to transit riders, with time valued at $1.00 per hour, is $112,000,000. The total annual loss resulting from traffic delays to all Chicagoans has been estimated at $500,000,000. Surely, in view of these conditions and the fact that 1,000,000 persons daily ride local transit in Chicago alone, it is evident that the solution lies in more adequate rapid transit facilities. Planning for restricted lane transit service in expressway structure makes possible the most effective and economical use of public money.

ILLUSTRATIVE of this type of arrangement is Chicago's West Side Expressway, now in construction. In this project, the City, County, and State are cooperating to provide an eight lane vehicle expressway with right of way in the median strip for CTA's rail rapid transit service. This magnificent structure is scheduled for completion in about two years, and will fulfill a long unrealized dream of an adequate highway between Chicago's central commercial district and the western suburbs, and at the same time make available a modern rapid transit structure connecting the Congress Street subway and the west side.

With all of these difficulties in prospect, it is most fortunate that municipalities, public officials, and civic leaders throughout the nation are realizing that local transit is indispensable to urban living. From the former attitude, in which it was merely tolerated, local transit is beginning to receive merited consideration for financial and other assistance by relief from franchise and other unfair taxes, more adequate traffic controls, and providing for local transit service in expressways, subways, and other structures where it can be operated unimpeded by street traffic.

With the welfare of millions and the vitality of the central city at stake, "Urban Transit Problems and the Engineer" is a topic that justifies attention of our best minds.—***End.***

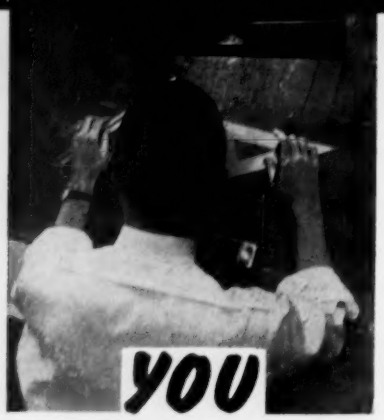
About the Author . . .

Mr. Gunlock

Virgil E. Gunlock, since July 1, 1954, has been chairman of the Chicago Transit Board, the governing body of the Chicago Transit Authority, a separate municipal corporation owning and operating the major local transit facilities serving that city and adjacent suburbs. Previously, he had served as Commissioner of Public Works, a position to which he had advanced after years of municipal service, starting out as an engineer employed by the Sanitary District of Chicago on construction of tunnels, bridges, and treatment works.

Mr. Gunlock, who was born on a farm near New Canton, Ill., on May 18, 1905, graduated from the University of Illinois in 1927 with a B.S. in civil engineering, achieved with scholastic honors.

He is active in professional engineering affairs, being a vice president of NSPE, a member of the Illinois SPE, the ASCE, and a director of the Western Society of Engineers. He also belongs to the American Public Works Association, the American Concrete Institute, the American Society for Testing Materials, the Chicago Plan Commission, and the American Society of Planning Officials.



- Second of Three Parts -

So YOU Want to Open a Consulting Office . . .

A Word About This Series . . .

This is the second installment of a three-part series entitled, "So You Want to Open a Consulting Office. . . ." Last month we learned about necessary qualifications from John B. McGaughy, P. E. Below, Mr. Ryan tells us about actually running the office, and next month Francis S. Friel will write about the all important subject of ethics. Why not read and save all of these worthwhile articles?

—The Editors

Operating Your Practice—

By ALFRED J. RYAN, P. E.,

Consulting Engineer of Denver, Colorado

PRIVATE engineering practice is a unique and complex field of endeavor. It is based upon providing professional services, but in many ways it is operated as a regular business. Proof of its complexity is found in the fact that there is no generally accepted and applicable name for the people so engaged. The usual term, "consulting engineer," is not completely accurate because it implies that all important services are rendered solely by the individual and are similar to those performed by doctors or lawyers, with employees' services being entirely secondary. The few engineers who operate in this manner constitute but a small percentage of the number who are called consulting engineers.

The average private engineering practice is devoted almost entirely to providing complete engineering services including the preparation of plans, specifications and detailed estimates. The principals may make all of the important engineering decisions and direct the activities of their staff, but the great volume of work is done by employees. This work often includes a very large percentage of the actual engineering for the project as well as all of the sub-professional work. With employees doing the major portion of the work, the consulting engineer encounters the businessman's problems of relations with employees and selling the products of others.

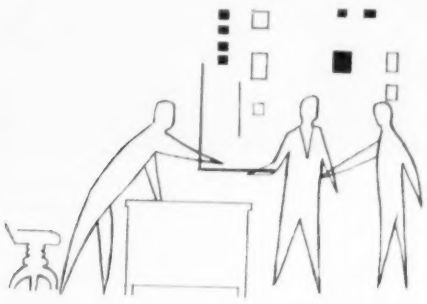
The conduct of this profession-business combination not only requires a number of abilities, but creates a few unique complications. Like a doctor or lawyer, the consulting engineer must depend upon his reputation to obtain new clients, but it is harder to become known because his past and present clients are usually fewer in number. As a businessman, he sells only the labor of a highly trained staff.

The methods of operating these complex private engineering practices are as individual as are the consulting engineers who conduct them. This is equally true of the manners in which the practices were brought into being. Consequently, any discussion by one individual about how to start and operate a private engineering practice is immediately subject to contradiction by every other consulting engineer. Such a discussion can understandably be viewed in the same manner as the parents of an unruly child view articles about rearing children. The expressed opinions have obviously been obtained from only one man's experience and may or may not be applicable for the reader's requirements.

Regardless of chronological order, consideration of the problems of conducting a private engineering practice must precede consideration of how to enter the practice. The requirement that an engineering practice must be

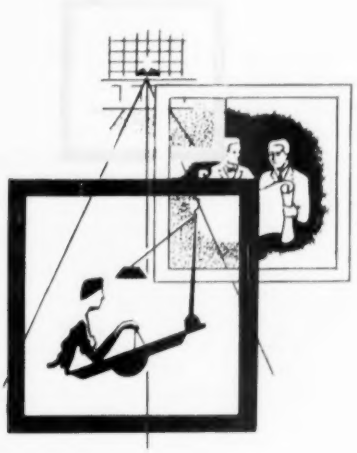
operated in a professional manner in spite of its business aspects is of much greater consequence to the consulting engineer than is immediately apparent.

FIRST, his relationship with clients must be comparable with that of doctors and lawyers. He must obtain and retain their confidence in his professional ability and integrity. He must thoroughly understand the financial and management aspects as well as the physical and operational aspects of their project, and give due consideration



to all of these in formulating recommendations and design procedures. As John B. McGaughy pointed out last month, business acumen is a basic "must" for a consultant. He must understand and respect the client's viewpoint, particularly when confronted with seemingly unreasonable demands. To establish this relationship, he must spend considerable time with each client.

Second, he must satisfy himself that the work done in his office is adequate to assure that all recommendations and plans are based upon what is really best for



the client. He must also make sure that work is completed on schedule. This requires both personal consideration of the various problems of the project and close contact with the work of all employees.

Third, he must fulfill his obligations to his profession. It is essential that he become known and respected by fellow engineers because, unless he is favorably known in his profession, there is little likelihood that he will become favorably known by potential clients. Let it also be clear, however, that the vast majority of the successful consulting engineers who devote their time and energy to the problems of the profession do not do so from a mercenary standpoint. Any man who possesses the qualifications for success is keenly aware that both his ability and the opportunities to serve his client in a satisfactory manner have been made possible by unselfish efforts of his predecessors. This awareness establishes his own obligation to devote time and energy in improving both the technical and the professional status of engineering.

His professional responsibilities also include service, without direct compensation, to mankind through public and semi-public organizations. By training and experience the engineer is especially qualified to provide valuable advice regarding the planning and maintenance of public and semi-public facilities. To serve properly, he must be active in the affairs of Chambers of Commerce, service clubs, parent-teacher associations and similar organizations. These are the responsibilities of every engineer, but the consulting engineer must lead in accepting them.

With all of these demands upon his time and energy, plus the requirements for managing the business aspects of his practice, the consulting engineer cannot hope to operate on a 40-hour week. He will find, too, that the same amount of time and energy required to operate his practice would produce a great deal more financial

return if applied to a strictly business enterprise. Unless his interest in engineering and the satisfaction derived from providing engineering services will compensate for the difference, he is in the wrong field of endeavor.

The unusual demands of time and energy are not the only requirements for conducting an engineering practice in a professional manner. The consulting engineer must understand and thoroughly believe in the concept of ethics. He must realize that the reason for the preparation of codes and canons of ethics is to define procedures that will assure that the actions of practicing engineers are in the best interest of the clients and of the reputation of the profession. He must, also, realize that he will be confronted with competition from individuals who are concerned about ethics only when they can be used to serve selfish interests.

THE discouraging problem of conducting an ethical practice against such competition is most apparent in the establishment of fees. This procedure is complicated by the fact that few clients are capable of determining whether the services rendered have been adequate to best serve their interests. The responsible engineer must charge a fee which is adequate to allow for a thorough solution of the problem and for the preparation of plans and specifications which are sufficiently complete to assure that the client will obtain the required project at a minimum of cost. The responsible engineer is also obligated not to take advantage of the client's lack of knowledge by charging an unreasonable fee.

Engineering fees are determined in numerous ways. The majority are based upon either a percentage of the construction cost, a lump sum, or hourly rates. Due to the varied character of engineering work it has been impossible to establish percentages of cost which are applicable to all types of projects. Nevertheless, various engineering societies have prepared curves and supplemental information which can be of material assistance in the establishment of fees. Because of the variations in requirements for different types of projects and in conditions under which engineering practices are conducted, all general information regarding fees should be considered as a guide only and should be supplemented by actual experience at the earliest practicable date.

Another important aspect of conducting a private engineering practice is the unique relationship with employees. In no other field of endeavor are so many professional men the employees of other professional men. Many employees are as technically competent as are their employers. Many others are young engineers seeking experience. To attain a proper relationship with his employees, the consulting engineer must set an example of proper professional conduct; recognize the fact that his employees are a part of the profession whose interests he is endeavoring to advance; provide opportunities for the employee to fulfill his obligation to the profession; and provide opportunities for young engineers to learn and to advance. Above all, due credit must be given to the work of any employee whenever the opportunity is afforded.

THE strictly business procedures of established consulting engineers' practices vary even more widely than professional procedures but the determination of costs demands consideration in the conduct of every practice. One acceptable basis for considering costs is to relate all other expenses to the basic salary of those employees who are directly engaged in productive work.

Ordinary overhead falls into two categories. The items directly related to salaries include vacations, sick leave, insurance and salary taxes. The costs of these items vary because of differences in policies regarding vacation and sick leave and because the amount of the salary taxes are dependent upon the size of organization, but the total cost will usually fall within the range of 10 to 15 per cent of the basic salaries. The general overhead items, such as rent, supplies, general transportation, secretarial services, communications, etc., will vary materially with the size of organization and the manner in which it is operated. For average conditions the cost of these items will fall within the range of 30 to 40 per cent of the basic salaries.

A condition which is often overlooked prior to having actual experience is the requirement for supervision. Experience and observations indicate that one full-time supervisor is required for each six to ten employees. In small organizations the consulting engineer himself can provide the necessary supervision. In larger organizations, the necessary supervision is provided by either the creation of a partnership or by employing supervisory personnel. Such personnel must be qualified as both engineers and administrators. Since a large percentage of the work done by the supervisors cannot be classified as directly productive, the overhead item must be increased by about 15 per cent of the basic salaries to compensate for the cost of supervision. The fact that supervision provided by the principal or principals does not require any expenditure tends to equalize the net returns from small and large practices.

Another factor, often overlooked, is the amount of non-productive time for the entire organization. The maintenance of an adequate staff always necessitates a certain amount of stand-by time. Other non-productive time is spent on catalogues, files and cost indexing. This is another item for which the actual cost will vary widely with the organization. There are, however, few cases in which the cost will be less than 10 per cent of the basic salary costs.

THE remaining costs are much less direct and vary considerably with the individual. They include expenditures for the creation of good will; expenditures for dues and for the activities of engineering societies, clubs, and

(*Continued on page 38*)

A typical challenging project for the consulting engineer. Shown is the proposed location for a new tunnel under the Houston, Texas ship channel.

How consulting engineers contribute to the public welfare.—To eliminate ice and snow hazards for motorists and help solve traffic congestion in cold weather, snow melting systems are being installed in access ramps leading to the new $25-million Boston, Mass. Aerial Highway.

An *American Engineer* SPECIAL REPORT

Re: Case Histories in Manpower Development

● A recent American Management Association publication that should be of considerable interest to engineers in industry and in industrial management is Booklet Number 219 in the AMA Manufacturing Series, entitled "Meeting Production's Manpower Needs." The report deals with three general themes: man-hour utilization, production management development, and middle management potential. Each is treated through the factual presentation of the method of one or more individual companies' handling of the problems involved.

Some very important observations are made by W. W. Gilmore, president of the Micro Switch Division, Minneapolis-Honeywell Regulator Company, Freeport, Illinois. Dealing with the problem of obtaining maximum man-hour utilization, the Micro Switch executive makes the telling point that, in the scramble to hire additional personnel to meet its expansion needs, a company may all too easily over-hire to the point of actually damaging the effectiveness of its production activities.

In warning against confusing numerical manpower with productivity, Mr. Gilmore writes: "The real problem is not only in the new people added, with the low productivity that comes from inexperience, but in the diluting of proper supervision by spreading its efforts over too much territory, too many people, and just plain too much to do . . . "

"An informal study," he continues, "convinced me that better than 20 per cent of our time, during the 'hurry up' period of our big jumps in growth, was taken up by our experienced people's having to redo work that was badly done in the first place—through ignorance, bad instructions, or insufficient planning and thinking at the inception. You must spend time at the start to save more later."

The second section of the AMA booklet deals with production management development programs. Four companies are represented.

In the first instance, Joseph W. Shimp, plant manager for the Marinette Paper Company, Fort Edward, New York, reviews the way in which his firm instituted a personalized improvement program with a base group of thirty-five to forty men of promising management potential. The program also involved the establishment of a permanent Manpower Development Committee to help the various division heads with their evaluation and development problems.

In the second case history, James H. Hunter, vice president—manufacturing, Columbia Records, Inc., Bridgeport, Connecticut, describes the steps taken when the Columbia Broadcasting System decided to enter the phonograph record business and, furthermore, to develop the necessary management group (from foremen and assistant supervisors up to the vice president in charge of production) from employees already working for the CBS-purchased American Record Company. He explains the management program as it operates in the firm today and evaluates the results of its fifteen-year application.

F. Y. Tiernan, general manager of the Pittsburgh factory of the H. J. Heinz Company, is the third author to outline his company's plan for finding, training, developing, and holding men with managerial ability. He highlights, among other points, the fact that a beginner in an industry training program should realize that the worst mistake he can make "is that of trying to hide, deny, or cover up his errors. The sooner he learns he is not expected to bat 1,000 per cent, the sooner he confesses and profits by his failures and assures his future success." He also emphasizes the responsibility of top management to provide an atmosphere in which a man can find real job satisfaction and the responsibility of the production man to assume his full share of the managerial burden and exercise the authority that goes with it.

The final article in the management development section is by John H. Vohr, general superintendent, Gary Steel Works, U. S. Steel Corporation, Gary, Indiana. In this piece, Mr. Vohr describes the program followed in Gary to provide supervisors with a better understanding of the over-all operation of the world's largest integrated steel plant where they are employed and to develop their leadership qualities. A week-long "Institute" conducted by company executives and based essentially on the theme, "Our capacity as managers is developed by cementing our man-to-man relationships through effective communication," is the core of the Gary plan.

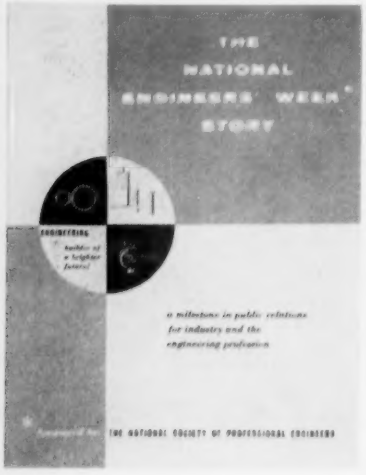
The last chapter of the AMA book is a thought-provoking article by William G. Caples, vice president of the Inland Steel Company, Chicago, Illinois, in which he discusses the potential power of middle management, both on and off the job. "A company without a sound middle management group," Mr. Caples concludes, "is a hollow shell. This is the real power of middle management. Its responsibilities are multiple and awesome—and its rewards are not always prompt or adequate."

Copies of this informative publication are available from the American Management Association, 1515 Broadway, Times Square, New York 36, N. Y., at $1.75 to non-members and $1.00 to AMA members.

Kits Are Ready; EW Program Underway

The first "opening gun" in the campaign for the 1956 National Engineers' Week program has been fired this year with the National Society's mailing of the booklet entitled "The National Engineers' Week Story," as well as the chapter promotional kits.

The 12-page, two-color booklet was first sent to a mailing list of over 500 industrial firms, all of them large employers of professional engineers. It is now being mailed to all local chapters and state societies affiliated with NSPE.



The booklet tells the story, in words and pictures, of the extent of the 1955 observance of National Engineers' Week throughout the country. Starting out with a message from Anatole R. Gruehr, national chairman of the Week, the booklet presents a graphic portrayal of how the events were publicized in the newspaper press, on radio and TV programs, and through a variety of local projects ranging from dinner meetings and special engineering exhibits to proclamations by state governors and other civic officials.

The objectives behind the preparation and distribution of the booklet, according to Dr. Gruehr, were to "bring together in a single publication something of the widespread nature and extent of the Week, and to stimulate a greater participation by industrial firms in the programs sponsored during the Week by state societies and local chapters."

Additional copies of the booklet are available from the National Society for distribution to industrial firms.

The 1956 National Engineers' Week kits have also been put in the mails. They were prepared this year on the basis of replies received from a questionnaire sent to all local chapters earlier in the year.

A feature of the kits this year is a special engineering section published in Arizona during the 1955 Week. This insert was included in the kits as an outstanding example of a special newspaper section produced through the efforts of professional society members.

The full-page advertisement on the opposite page gives the prices for all promotional aids available from the National Society.

A variety of promotional aids for National Engineers' Week have been prepared by the National Society. These include one-minute TV films, tape recorded radio programs, TV slides, large and small posters, banners, newspaper mat stories, seals, and logotypes for printed matter and advertising.

Order blanks giving prices and a description of the material available are being mailed to all chapters and state societies. Local committee chairmen for the Week are urged to place their orders for these promotional aids as early as possible.

The ever increasing growth of the TV audience throughout the country has prompted the National Society to make a sizable investment this year in promotional aids designed for television. NSPE affiliates are offered a set of seven TV slides, and a set of five one-minute TV films. All of these were prepared for use on public service broadcasting time.

The slides, designed and made up according to network specifications, utilize a poster technique to call attention to the Week and to the contributions of the engineering profession to our modern life. The slides are offered in a set of seven, one for each day during the Week of February 19-25.

(Continued on page 47)

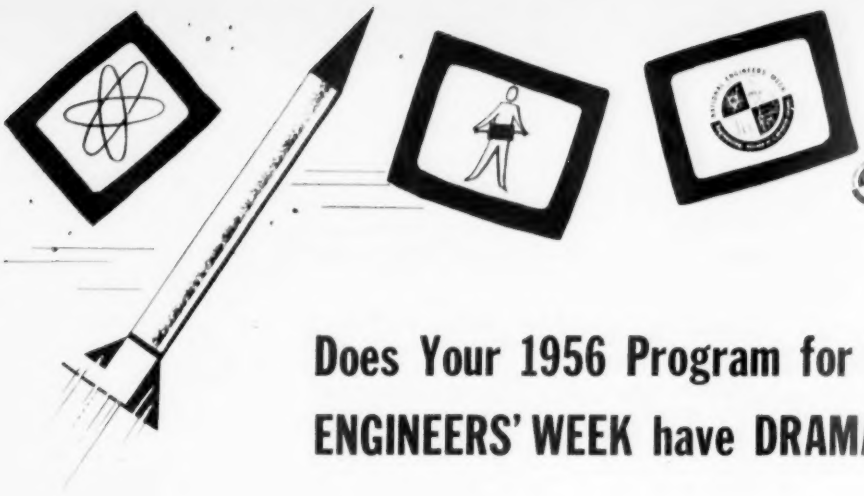
Support Needed!

The week of February 19-25, 1956, will undoubtedly be the occasion for the most comprehensive and widespread observance of National Engineers' Week since the National Society began the sponsorship of this event. Even at this early date industry, engineering school, and professional society interest in the Week indicates the remarkable degree to which the observance has "caught on." Because of this general acceptance, the National Society has prepared an extensive series of TV slides and films. These, along with a tape recorded radio program and the other promotional aids, will definitely bring the impact of the Week before a large segment of the public.

Local chapter officials should know that these materials were prepared by leading professionals under the direct supervision of the Public Relations Committee and have the full endorsement of the National Society. Television is an expensive medium, but it reaches an audience in the millions. All responsible officers should, therefore, make every effort to avail themselves of the TV shows and other promotional aids made available at cost prices, to assure financial solvency of the project.

Because of the National Society's underwriting of the financing of the Week, it can be truly said that the whole project "belongs" to the NSPE affiliated chapters and state societies. The "national" character of the Week was built up solely by NSPE. It thus deserves the full and continued leadership of the entire National Society membership.

Allison C. Neff, P.E.
President



Does Your 1956 Program for NATIONAL ENGINEERS' WEEK have DRAMATIC IMPACT?

IT will have if your chapter takes advantage of these expertly prepared aids for dramatizing the story of engineering in our modern world. Here are the basic promotional materials that will help every chapter build a successful Week's observance. Use the order coupon below.

1. FIVE 1-MINUTE TV FILMS: This set of 1-minute "spot" films will get your chapter's National Engineers' Week message on TV screens throughout your local area. Filmed in a top studio under expert direction, the films feature experienced TV network performers. The five films are designed to dramatize outstanding accomplishments of engineering for a general audience. They cover the engineering contributions to atomic energy, radar, air transportation, space satellites, and construction. All five will qualify for public service time during TV station "breaks." Price: Set of five films, $25.

2. "PROJECT SATELLITE—AN ENGINEERING STEP TO OUTER SPACE." This is a 15-minute tape recorded radio show that tells the engineering story behind the planning and construction of the proposed earth satellite. It features President Eisenhower's press secretary, James Hagerty, making the White House announcement that the U. S. would build a satellite, and a talk by Dr. Fred Singer, the University of Maryland physicist whose calculations for the MOUSE project have been widely discussed in scientific circles. A dramatic public service program with radio network voices. Price: $7.

3. SET OF SEVEN TV SLIDES: Here is a chance to get TV coverage every day during the Week. These expertly prepared slides are designed for use on TV station breaks. They feature poster-type art work and printed copy calling attention to engineering and the Week's observance. Price: $10 per set of 7.

4. POSTERS: Colorful 10¼ x 10¼-inch coated cardboard posters carrying the 1956 Engineers' Week emblem. Prime necessities for bulletin board, window, and other displays. Large-size (22½ x 22½-inches) also available. Prices: 10¼-inch, $4 per 100; 22½-inch, $5 per 100.

5. PAPER BANNERS: Excellent for display use. Three feet long by 6 inches wide. Has poster design and words "National Engineers' Week," in color. Price: $4 per 100.

6. ENGINEERS' WEEK SEALS: Use these brightly colored seals on all your mail from now through Engineers' Week. Poster design printed on 1½-inch gummed paper. Price: $3 per 1000.

7. NEWSPAPER MAT STORY ON SPACE SATELLITE: A feature article on the engineering behind man's first step into outer space. Prepared on mat, ready for immediate insertion in daily or weekly newspaper. Price: 50c each.

8. NEWSPAPER MAT STORY ON GEORGE WASHINGTON AS AN ENGINEER: A feature article, with illustration, based on fresh material gathered by writer visiting Washington's Mount Vernon home. Ready for immediate newspaper insertion. Price: 50c each.

9. LOGOTYPE: A metal cut of poster design to insert in advertisements, printed matter, etc. All state society and chapter publications should have one. Excellent for use in industrial house organs and other publications. Price: $1.50 each.

10. "THE USS NAUTILUS—AN ENGINEERING AGE TRIUMPH." A re-issue of the 15-minute tape recorded radio program distributed last year. Just as timely this year, if your chapter did not use it in 1955. Tells the engineering story behind the first atomic powered submarine. Price: $5.

ORDER YOUR AIDS NOW!

National Society of Professional Engineers
1121 Fifteenth Street, N.W.
Washington 5, D. C.

Sirs:

Please rush me items indicated. I enclose a (check) (money order) in the amount of $

I understand remittance must accompany order.

Name _____

Address _____

City _____ **State** _____

- ☐ 1. One-minute TV films. Set of 5 films @ $25 per set.
- ☐ 2. Radio tape, "Project Satellite—An Engineering Step to Outer Space," @ $7 ea.
- ☐ 3. TV slides. Set of 7 slides, @ $10 per set.
- ☐ 4. Posters, regular size @ $4 per 100. Posters, large size, @ $5 per 100.
- ☐ 5. Banners @ $4 per 100.
- ☐ 6. Seals @ $3 per 1000.
- ☐ 7. Newspaper mat story on space satellite @ 50c ea.
- ☐ 8. Newspaper mat story on Washington as engineer @ 50c ea.
- ☐ 9. Logotypes @ $1.50 ea.
- ☐ 10. Radio tape, "The USS Nautilus—An Engineering Age Triumph," @ $5 ea.

book looks

The Book: **History of American Industrial Science**

The Author: **Courtney Robert Hall**

The Publisher: **Library Publishers, 8 West 40th Street, New York, N. Y.**

Price: **$4.95**

Reviewing the Book: **D. F. Langenwalter, P. E., supervisor, Knolls Atomic Power Laboratory, General Electric Company**

THE panorama of progress due to science and engineering has been so swift and so broad that it is difficult to grasp. Professor Hall not only gives the broad picture in a most interesting manner, but also points out how scientists and industrial managers are working closely together to bring about changes. This interrelation of business and engineering is shown to be widespread by describing the development of industries in the fields of transportation, food, power, communications, materials, and many others. The recognition and discussion of this tie between science and industry makes the book unique and worth reading.

The over-all picture painted by Professor Hall shows how company after company grew through the combined efforts of engineers and businessmen. This teamwork has created an expanding economy which grows at an ever increasing rate. The depletion of resources or a major conflict may stop the increase, but the application of atomic energy to strictly peaceful purposes should allow our standard of living to rise indefinitely. In the concluding paragraphs, the author points out how the world is fast becoming a single community and that building up the underdeveloped countries would provide new markets for our industry.

Professor Hall made the book interesting by tracing the development of some of our major industries, bringing together information little known or not available elsewhere.

While the book gives a very readable story of our industrial science, the feeling remains that it would have had a greater impact if some of the ethical and political problems caused by the industrial revolution had also been discussed. When Professor Hall indicates how the world is becoming smaller, he might also have emphasized how closely interrelated the fields of science and politics have become.

Meet the Reviewer . . .

Mr. Langenwalter

Daniel F. Langenwalter, a native of Wayland, Iowa, received his early education in Twin Falls, Idaho, and graduated from Georgia Tech in 1941 with a B.S. in electrical engineering. He then went to Cornell University on a graduate scholarship, also becoming an instructor in electrical engineering, which post he held until 1945.

He joined the General Electric Company on a rotating engineering program in 1945. With GE he worked on the development of underwater sonic detection devices and radar fire control systems. Later he transferred to the industrial engineering section, working as an application engineer in industrial power and steel mills. He is now a supervisor at the Knolls Atomic Power Laboratory, and lives in Altamont, N. Y.

He is the immediate past president of the Schenectady Professional Engineers Society, of which he is now a director. He is also active on New York State and NSPE committees, currently being chairman of the state society's Constitution Committee and a member of the national Engineers in Industry Committee.

NCSBEE Meeting Held in Washington

The annual meeting of the National Council of State Boards of Engineering Examiners was held in Washington, D. C., at the Sheraton-Park Hotel, October 20-22. Among the highlights of the conference was the address by Brigadier General Charles G. Holle, Deputy Chief of Engineers for Construction, U. S. Army, which was delivered during the annual banquet. The title of General Holle's speech was "The Engineer—Key Man in Modern Technological Society."

The banquet also featured the installation of new officers. Bruce Williams of Joplin, Missouri, took over the presidency from J. W. Gore of Baltimore, Maryland. Both men are also members of NSPE.

Special Distinguished Service Certificates were presented to the following NCSBEE members: Marcel Garsaud, J. M. Gallalee, H. T. Person, W. K. Simpson, W. W. Hodge, M. K. Snyder, D. B. Jett, Joseph Weil, and C. E. Davis.

Many leading engineering figures, representing various professional and technical societies, attended the banquet as honored guests. Among those present was Robert J. Rhinehart, vice president of NSPE.

Research Man Is Wisconsin Speaker

Dr. George H. Brown, director of research, RCA Laboratories, Princeton, New Jersey, was the guest speaker at the first fall meeting of the Western Chapter of the Wisconsin SPE. The event was held jointly with the La Crosse Chapter of the American Society of Mechanical Engineers. The central theme of Dr. Brown's address was concerned with new developments in television by the RCA Lab.

Chemists Hear Robbins

Paul H. Robbins, executive director of the NSPE, was the guest speaker at the October 11th luncheon meeting of the Washington Chapter of the American Institute of Chemists. The subject of his talk was *Problems of the Professional Employee.*

Engineers' Week Planners

Members of the Engineers' Week Committee have already been appointed by President A. W. Moon of the Albany County Chapter of the New York State SPE. They are Thomas A. Parker, chairman, and S. Gorzelnik, Russell A. Wylie, and G. W. Turnes, Jr.

Members of the chapter also met recently at Panetta's Restaurant in Menands to hear a talk on *Helicopter Development* by one of the leading test engineers of the Sikorsky Aircraft Division of the United Aircraft Corporation.

Banker Is Speaker At Arizona Meeting

Dow Ostland, assistant vice president of the Valley National Bank, Phoenix, was the guest speaker at a recent dinner meeting of the Central Chapter of the Arizona SPE. The meeting was highlighted by the presentation of registration certificates to newly-licensed engineers of the area.

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PROFESSIONAL ENGINEERS' BUYERS GUIDE

An Added Feature in the . . .

NATIONAL ENGINEERS' WEEK ISSUE *American Engineer* **FEBRUARY 1956**

Every year the February AMERICAN ENGINEER is designated as NATIONAL ENGINEERS' WEEK ISSUE. Again, during 1956, the week of Washington's Birthday, February 19-25, will be celebrated as National Engineers' Week. The theme will be "Engineering—Builder of a Brighter Future." This annual observance honors the professional engineer for the great contribution he has made to the American way of life. The week will be observed across the nation by the President, State officials, governors, mayors and civic leaders. Many of the nation's leading firms will participate with special radio and TV programs, spot announcements, poster displays and like activities. The NATIONAL ENGINEERS' WEEK ISSUE of the AMERICAN ENGINEER will feature these activities for its more than 35,000 registered professional engineer readers. This timely issue will reach your TOP engineering market *(78.4% buy or specify)* during the first week of February.

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Please "X" your preference:

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- Fireproof Tiling
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- Floor Tile
- Glass Blocks
- Heating and Vent. Equip.
- Heating Panels
- Insulation
- Lath Boards
- Lighting Fixtures
- Lime, Building
- Lumber
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- Metal Ceilings
- Paints, Varnishes
- Plaster, Gypsum
- Plumbing Fixtures
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- Automobile Accessories
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- Belting, Machinery
- Blast Cleaning Equipment
- Blasting Equip., Materials
- Blowers
- Blow Torches
- Blue Print Papers
- Boilers, Accessories
- Boiler Feed Systems
- Bonds (Surety)
- Bookkeeping Machines
- Books, Technical, Scientific
- Brake Linings
- Brass Equipment
- Calculating Machines
- Calipers
- Cameras
- Castings
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- Chemicals, Industrial
- Chemicals, Sewage Treatment
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- Disinfectants
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- Hygienic Instruments
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- Ink
- Insecticides
- Instruments, Process Control
- Instruments, Testing
- Intercoms
- Iron Castings
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- Laboratory Apparatus
- Lacquers
- Lamps, Ultra-Violet
- Lenses, Optical
- Levels
- Lining Materials, Tank
- Linings, Corrosion Resis.
- Liquid Gas Containers
- Liquid Gas Pumps
- Liquid Level Controls
- Locks
- Lubricants
- Lubrication Systems
- Machine Guards
- Machinery, General
- Machinery Mountings
- Machinery, Special
- Magnesium
- Marine Engines
- Marine Oils
- Materials Handling Equip.
- Materials, Testing
- Measuring and Controlling Instruments
- Measuring Tapes and Rules
- Meters
- Micrometers
- Moisture Control Equipment
- Motor Oils
- Motor Trucks
- Name Plates
- Needle Bearings
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- Office Furniture
- Office Supplies
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- Oil (Lubricating)
- Oil (Paint)
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- Packaging Equipment
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- Paint Brushes
- Paint Sprayers
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- Paving Materials
- Pencils, Drafting
- Pens, Drafting
- Photocopiers
- Piling, Sheet
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- Pipe, Clay
- Pipe, Concrete Pressure
- Pipe, Iron
- Pipe, Steel
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- Plastics
- Polyester Resins
- Power Transmission Equip.
- Precision Castings
- Precision Instruments
- Preservatives
- Presses, Punch
- Pressure Vessels
- Public Address Equip.
- Pumps
- Radar Equipment
- Radiators
- Radio Apparatus
- Radio Equipment
- Radio Parts
- Railway Equipment
- Rectifiers, Power
- Reflecting Material
- Refractories
- Refrigerants
- Refrigeration Equipment
- Regulators, Pressure and Temperature
- Reproduction, Mach. & Mater.
- Resistors
- Roller Bearings
- Rotameters
- Safes
- Safety Equipment
- Saws
- Scales
- Scientific Instruments
- Seals, Pocket
- Sewage Treatment Materials
- Sewerage
- Shafting, Flexible
- Sheet Metal
- Shock Absorbers
- Silos
- Slide Rules
- Smoke Control Systems
- Soil Sampling Equip.
- Sound Systems
- Stainless Steel
- Steel (Other than structural)
- Stokers
- Supplies (Machinery)
- Surveying Instruments
- Sweepers
- Swimming Pools, Supplies and Equipment
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- Taps
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N.S.P.E. Believes

ONE SOCIETY FOR ALL

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

THE scope of NSPE activities sometimes makes it difficult for busy members to keep abreast of all that is going on. NSPE diligently attempts to inform its members of all items of interest to them through its numerous publications. THE AMERICAN ENGINEER, of course, is the principal means of doing this. Then, to bring the periodic reports into a complete picture, the Society publishes its Annual Report, a copy of which is sent to each member. Nevertheless, communication in the Society is as difficult a problem as in many other endeavors.

Naturally, each of us is most interested in the programs, activities and items that concern us directly. If we see activities of primary concern to other facets of the engineering profession, we tend to be impatient that more attention is not given to the particular programs directly concerning us, forgetting that it is the composite of all these programs that makes for progress toward professional status. This is probably the greatest contributing factor to the frequent and conflicting complaints that NSPE is interested only in the consultants' problems, or the problems of the engineer in industry, or the government engineer, or registration, or legislation, or public relations, or salaries, or some other program which may be getting attention at the time.

The independent nature of engineers, coupled with their training to reach an independent conclusion, has contributed to groups with a particular problem before them endeavoring to enlist support for their point of view. These groups seem inevitably to become impatient and start new organizations. We have seen it develop with societies formed in specialized branches of engineering to solve problems in specialized fields of activity.

The most recent development which should be of concern to the entire profession is to suggest societies in addition to our seventy-five or more current national societies, founded upon types of employment. This suggestion usually is based on the development of special problems unique to only a portion of the profession. In almost every case the problems are professional, rather than technical, in nature. Thus they are, and should be, of concern to NSPE.

It has been said that either due to limitations of time, staff, or finances, NSPE has not adequately met these problems; or, it is not equipped to handle the problems of these groups; or our communications have fallen down so that the groups concerned are not aware of what NSPE has done or can do to resolve the problems involved.

The Board of Directors, at its fall meeting in Memphis, gave each of these factors thorough consideration. The first of these may well be a real limitation. However, with our increased membership and considerable progress of the last few years, NSPE is in a much better position to serve than it has been in the past. Increased membership, of course, provides an obvious and immediate solution to this limitation. The aggressive support of the groups involved by becoming members, serving on committees, and being active at local, state, and national levels, gives immediate impetus to the solution to their problems.

Now, turning to the second point:—Carefully considering the comments of President Allison Neff in the article, "Let's Take Warning from History," in the October issue of THE AMERICAN ENGINEER, and a report from NSPE's Engineering Practices Committee, (see page 30), the Board at the recent Memphis meeting encouraged the formation of functional groups at all levels of NSPE. Thus, groups of like employment interest may get together, resolve their own problems wherever possible, and secure the support of the entire professional organization on those items where broader support is needed for the benefit of the entire profession.

Recognizing the third element above as extremely vital, the Board suggested the development of special publications to be devoted to timely information of interest to these groups. A news letter reporting on developments of interest to engineers in industry, and another for engineers in private practice, was suggested as providing a much needed service.

NSPE believes that implementation of these considerations will provide means of giving greater service to important groups of the profession, with the merit of giving attention to specialized problems without resorting to further complicating our profession by the creation of additional societies.—***End.***

NSPE President Allison C. Neff is shown introducing banquet speaker, Mr. Henry G. Riter, 3rd, president, National Association of Manufacturers, to guests at the Memphis affair. Others in the picture are, from left to right, Mrs. Neff; NSPE Vice President Warner Howe (hidden); and Mrs. Howe.

Tenn. SPE Hosts NSPE Board At Fall Meeting in Memphis

THE Fall Meeting of the National Society of Professional Engineers was held at the Hotel Peabody in Memphis, Tennessee, October 13-15, in conjunction with meetings of the Tennessee and Arkansas Societies of Professional Engineers, and the non-affiliated Mississippi SPE.

Mayor Walter Chandler of Memphis delivered a welcoming address to the delegates, prior to the opening of the official business session on October 14. The preceding day had been devoted to a conference of the NSPE Executive Committee, whose members were entertained at a special luncheon by the Westinghouse Electric Corporation, and an "ice-breaker" party arranged for the arriving delegates by the Ladies' Auxiliary of the Memphis Chapter.

NSPE President Allison C. Neff presided at the first general professional and business session on the 14th. As the reports of the various NSPE committees were received, the meeting was turned over to the chairmanship of the vice president assigned to lead each related group, according to the new functional organization of committees recently adopted by the Society.

The popular regional luncheon meetings, each presided over by a vice president, were also held to give the P.E.'s from various geographical areas a chance to exchange views and discuss problems of mutual concern.

A HIGHLIGHT of the meeting was the Friday banquet at which the guest speaker was Henry G. Riter, 3rd, president of the National Association of Manufacturers and this month's featured AE author (see page 11). During his talk, Mr. Riter warned particularly against the dangers of unionization to the engineering profession.

Another scheduled guest speaker—Col. W. F. Powers, assistant to the Chief of Engineers, Corps of Engineers, U. S. Army—was unable to present his address at the Saturday luncheon because of a sudden illness. In his absence, the speech was read by Paul E. Gieselmann, a member of the Memphis Chapter.

Members and guests also had the opportunity to view industrial exhibits provided by approximately twenty nationally-known firms.

Lorin B. Allen of the Tennessee SPE served as general chairman in charge of arrangements for the meeting, with Robert H. Hoshall as co-chairman and NSPE Vice President Warner Howe as advisor.

Chairmen of the various committees were: G. D. Albrecht, publicity; Robert H. Hoshall, reservations; L. T. Sumner, exhibits; L. F. Jaseph, program; Jack Edwards, entertainment; John C. Brough, Tri-State planning; Lyman Winn, registration; Paul Gieselmann, printing; L. H. Lanahan, budget; and Henry Clayton, greeters. They were also assisted by Robert Milner, president of the host chapter, and Hugh Carey, who served as treasurer for the event. In addition, a special committee headed by Mrs. John C. Brough, president of the Memphis Ladies' Auxiliary, arranged a special program of activities for the wives in attendance.

Highlights of the professional action taken during the meeting itself and of reports received from the various NSPE committees are as follows:

—Professional Practice Group—

EMPLOYMENT PRACTICES—ENGINEERS-IN-GOVERNMENT SUBCOMMITTEE

This progress report will advise the Board of current Subcommittee activity which may form the basis of recommendations at a later date.

1. Registration and separate professional classification of Federally-employed engineers.

Prior to the adjournment of Congress preliminary conferences were held with appropriate members of Congress to ascertain interest in introducing the required legislation. The first step is to obtain passage of a bill to provide a separate professional classification for professional engineers as distinguished from their present inclusion in the general schedule. The NSPE Legislative Committee and staff will continue to work on this matter. Once this has been accomplished we will be able to seek further action to require registration of Federally-employed engineers, starting with Grade 13. It will be recalled that both of these items have been approved by the Board as policy matters.

2. Outside Engineering Practice by Government Employees.

It has been suggested to the Subcommittee that NSPE should develop a policy statement as a guide in this connection. The members of the Subcommittee have submitted written comments on the general questions involved and these comments are now under study. In addition, letters have been sent to the heads of Federal departments and agencies employing substantial numbers of engineers, seeking information on existing Government policies in this connection. The replies are just now beginning to come in and the Subcommittee will analyze the practices and regulations reported by the Government agencies.

It is too early to indicate whether it will be found that an NSPE policy is desirable, or, if so, the form it should take. Preliminary comments by Subcommittee members indicate that such a policy may well involve ethical considerations. In this event the draft of such a policy will be coordinated with the Ethical Practices Committee prior to submission to the Board.

3. Activity at State and Chapter Level.

It should be noted that the problems of Engineers-in-Government should not be thought of only in terms of the Federal Government. Corresponding problems exist in the state and local governments. Some State Societies and Chapters have given extensive consideration to the interests of governmental employees, but more may find it desirable to give added attention to this important segment of the profession. The Subcommittee hopes that those State Societies and Chapters which have not done so will consider the establishment of appropriate Committees for this purpose. It is further hoped that such State and Chapter Committees will coordinate their work with the National Subcommittee in this field, as the work in each element should be of interest and importance to the others.

Board Action: Report approved.

EMPLOYMENT PRACTICES—ENGINEERS-IN-INDUSTRY SUBCOMMITTEE

Recommended for Board Action:

1. The Engineers-in-Industry Subcommittee recommends that the Board adopt the attached policy statement, "Professional Status Under Wage-Hour Law." This action is needed as a basis for scheduled hearings before Congressional Committees later this year, or early in 1956, in connection with pending bills to revise the Wage-Hour Law. It will also serve as basic NSPE policy for further cooperative activity with industry in seeking to constantly improve the professional treatment of professional engineers.

2. The Engineers-in-Industry Subcommittee recommends that a publication be prepared by the National Society of Professional Engineers each month for the dissemination of information of interest to employed engineers and employers of engineers. Distribution will be to industry, other employers of engineers, interested persons and organizations, and to NSPE members upon request.

The present Subcommittee has held one meeting since the beginning of the administrative year. At that meeting the following major items were discussed and acted upon as follows:

Revision of Wage-Hour Law

After extensive discussion of the implications of the proposed changes in the law as affecting professional employees, it was decided to recommend the establishment of NSPE policy as indicated below.

PROFESSIONAL STATUS UNDER WAGE-HOUR LAW

The Federal Wage-Hour Law has, from its inception, excluded professional employees from the minimum wage and overtime provisions. The theory of the exclusion has been based on a recognition of the unique nature of professional services, in that professional duties require flexibility in terms of hours worked and that in such circumstances it is not practical or equitable to bring professional employees into the same rigidity of employment conditions which may apply to those working under conditions susceptible of standardization of hours of employment. The theory of the exclusion has also been based on the flexible working conditions of professional employees which permit professional personnel greater freedom and latitude in hours worked and in outside professional or personal activities.

The National Society of Professional Engineers believes that such a recognition of the essential differences between professional and non-professional employment is sound and should be continued in any revision of the Wage-Hour Law. The Society therefore is opposed to any revision of the law as applied to professional employees which would establish minimum earnings tests to qualify for professional status.

The National Society of Professional Engineers further believes that cooperative efforts should be continued and expanded to bring about a greater recognition of professional status of professional engineers, both in terms of remuneration and in employment conditions. Employers should be encouraged to accord their professional engineer employees professional status in the fullest sense: in terms of improved economic position, allowance of working time for outside professional activities, registration under the state engineering registration laws, advanced education, and in all other possible ways to encourage the true spirit of professional-employer relationships.

Establishment of Professional Criteria

It has been suggested that NSPE should develop criteria of professional treatment of employed engineers, indicating those standards which are considered proper professional treatment. It has been further proposed that such criteria be used to rate companies and that such ratings be made known to graduating engineers and others. The Subcommittee determined that the first step in such a program must be the development of the criteria. Each member of the Subcommittee is now drawing up suggestions of a specific nature. Following receipt of all suggestions a further meeting will evaluate the proposals and seek to refine them into a comprehensive list. Whether such criteria should be used as a basis for rating companies poses a number of difficult problems. This point was left for further consideration after the first step has been accomplished. Consideration also was given to using the criteria in the form of a check list and send it to companies for self-appraisal. It might also be used as a check list by engineering graduates at the time of interview by company representatives. There are many other possible uses of such criteria, but the immediate attention of the Subcommittee is in its development. The suggested criteria will be submitted to the Board for official NSPE approval before publication or distribution.

Board Action:

1. **Wage-Hour policy statement approved.**
2. **Monthly publication item to Ex. Com. for consideration.**

EMPLOYMENT PRACTICES—ENGINEERS IN EMPLOY OF PRIVATE PRACTITIONERS SUBCOMMITTEE

The function and aims of the subcommittee have been considered by its membership. The application of the Wage-Hour Law to consulting engineers has been studied, and, especially the proposed amendment to the Wage-Hour Law setting forth a minimum salary requirement for professional status.

The opinions of the majority of the subcommittee relative to the Wage-Hour Act have been summarized below. This summary was formulated by the Idaho Society of Professional Engineers whose Mr. Riedesel is working both on the state level and with this subcommittee. This summary is as follows:

"Rate of compensation is not a criterion of professional status nor should professional status be used as a subterfuge to permit or condone inadequate compensation or poor employment conditions. We deplore the need for legislation on professional employment matters. As a profession, we should raise our employment conditions above the need for legislation or Federal control. Unfortunately, they are not beyond improvement or need for correction so we should not object to beneficial regulation. If we do not keep our own house in order, we must expect outside interference.

"Certainly, $6,000 per year is not too high a minimum salary for any professional engineer for claiming Wage-Hour Law exemptions; however, many engineers both in administrative and strictly professional positions are now receiving salaries less than that figure. Possibly, some Federal control on hours and rates of compensation would benefit the economic status of the engineering profession since we are too much inclined to underrate the value of our own engineering services."

All but one member of the subcommittee have expressed themselves relative to this report and especially in regard to the Wage-Hour Act. All members deplore the need for legislation on professional employment matters. Subcommittee Member Turpin is "opposed to regulation, in any form, of wages and hours of anyone engaged in engineering."

Following a discussion at a regular meeting of the Chicago Chapter, the Idaho resolution was endorsed by 17 of the 24 members voting.

Board Action: Report approved.

ENGINEERING PRACTICES—PROFESSIONAL REPRESENTATION FOR CONSULTING ENGINEERS IN PRIVATE PRACTICE

Introduction

N.S.P.E. has been a consistent advocate of unity in the engineering profession since its inception. It is recognized that engineers, with similar technical interests, naturally form technical societies with membership in the society being limited to those engineers interested in that particular field. N.S.P.E. activities, rather than conflicting with those of the technical societies actually complement them by providing for the professional status of the engineer.

With the advent of many new and complicated engineering developments, engineers have been forced to specialize in relatively narrow fields due to the complexity of our modern civilization and our rapid technological advancement. This has resulted in the creation of many new technical engineering societies.

The organization of these societies, while being advantageous to the technical development of the engineer, has not adequately provided for his professional development. This has also resulted

in a splintering of the profession. The major technical engineering societies as well as N.S.P.E. have recognized that the prime need of the professional engineer is a *unified profession*. The aims of the two groups in this respect are the same; the only difference being the practical matter of how to obtain the desired professional unity.

The Problem

Consulting engineers comprise a relatively small portion of the total engineering profession. Recent surveys indicate that this group is approximately 5 per cent of the engineering profession; however, its importance to and impact on the profession is far greater than its numerical strength. Being a professional society, N.S.P.E. is actively engaged in improving the professional status of the engineer. The consulting engineers, representing as they do a high level of professional activity, are of more than average concern to N.S.P.E.

The formation of independent organizations of consulting engineers is a matter of grave concern to N.S.P.E. To properly evaluate the effect of this movement, it is necessary to consider these factors.

1. The formation of independent organizations of consulting engineers implies that N.S.P.E. has failed to properly represent its small but important group of consulting engineering members. These organizations have indicated that their consulting engineering membership feels the need for adequate professional representation, which they believe N.S.P.E. is not furnishing.
2. The formation of independent organizations of consulting engineers causes further splintering of the profession which makes the goal of professional unity more difficult of obtainment.

The problem is, therefore, how can N.S.P.E. further promote the unity of the profession and provide for the type of representation needed by consulting engineers.

Existing Conditions

N.S.P.E. membership is composed of both employers and employees. The members are all professional engineers in industry, government, construction, education, public utilities, and consulting engineering. Of all these groups, the consulting engineers are one of the smallest. On the other hand, its influence in our society is much greater than its membership strength.

As can be expected, some members in N.S.P.E. have very definite feelings about the consulting engineer group. Here are typical comments on several sides of the problem:

1. Why should engineers in industry join N.S.P.E. which is predominantly a consulting engineering employer group?
2. The wishes of a majority of our members in regard to wage-hour legislation, etc., are being disregarded in favor of the desires of the consulting engineering employers.
3. The position of the Society is being unduly influenced by the selfish desires of employee members.
4. The problems of the two groups are entirely different and cannot be properly represented by the same society.
5. Members in industry do not receive proper recognition from the consulting engineering controlled N.S.P.E.
6. Consulting engineers (employers) are not receiving proper representation from a society that is predominantly employee controlled.

These expressions from the membership of the national and state societies clearly indicate that the misunderstandings among many of the members should be brought out in the open and resolved by N.S.P.E. for the welfare of the profession.

The number of meetings being held and the interest shown by consulting engineers in the formation of a professional society to represent them, would indicate the need for a professional group to represent the consulting engineers. Although N.S.P.E. membership is composed of a group predominantly interested in other fields, the consulting engineers' problem is basically a professional engineers' problem, and as such it is of vital concern to N.S.P.E.

Possible Solutions

Any satisfactory solution to the consulting engineers' problem must satisfy the following conditions:

1. Consulting engineers must be able to hold membership in a professional society that can furnish the professional representation and services they require.
2. Membership in the society mentioned above must strengthen the profession and promote professional unity.

There are three methods that should be examined before selecting a medium to execute the recommendations in the above paragraph. They are as follows:

1. Use of the established major technical engineering societies.
2. Use of an independent national organization of consulting engineers.
3. Use of N.S.P.E. and its state societies.

The technical societies' case would be approximately as follows:

1. These societies are primarily technical engineering societies whereas, the consulting engineers need a professional society.
2. The consulting engineers need one society to speak for them on professional matters.
3. A federation of societies can not do an effective job due to the fact that it is too remotely connected with the individual consulting engineer.

The case of an independent national organization of consulting engineers can be summarized as follows:

1. This type of organization would be in a position to devote its entire time and energies to the problems of consulting engineers.
2. Since the potential membership in this organization is very small, they may not have sufficient funds to properly staff the type of organization needed by consulting engineers unless the dues are exorbitant.
3. Engineers recognize the fact that there are too many engineering societies now. The formation of new ones will cause further splintering of the profession.
4. Due to its small membership this type of society would have limited influence in matters of public opinion and legislation.
5. An independent national organization of consulting engineers could result in a barrier being erected between the professional employer and the professional employee. This could foster the development of the so-called professional engineering labor unions, and destroy any chance of achieving unity in the profession.
6. A consulting engineering organization would be primarily an employer group. Any policy statements would be subject to attack by the public on the grounds that the position taken by the group was motivated by "selfish interests."

The N.S.P.E. case can be summarized as follows:

1. N.S.P.E. is a professional society whose entire membership consists of professional engineers. Its major concern is the professional status of engineering.
2. N.S.P.E. is actively working for unity of the profession.
3. N.S.P.E., with a membership in excess of 35,000 has already achieved recognition as the only professional engineering society devoting its entire efforts to the professional aspects of engineering. Its status would carry considerably more weight and prestige than that of a smaller consulting engineering group.
4. N.S.P.E. membership is composed of professional engineers including both the employees and employers. This fact makes N.S.P.E. policy statements generally acceptable to the public since these policies having been adopted by both employees and employers, do not represent the so-called "selfish interests."
5. The composite membership of N.S.P.E., consisting of professional engineers in industry, construction, government, education, public utilities and consulting engineering, makes it difficult for the Society to devote sufficient time to the exclusive problems of consulting engineers without neglecting the interest of the other members.

Recommendations

It is believed that the consulting engineers can be best represented by functional groups on state and national levels within the N.S.P.E. framework. As a matter of fact, a number of our state societies now have such functional groups in operation. The state societies' functional groups cannot solve the problem without coordination with other state societies working through N.S.P.E.

In order to solve this problem, it is recommended that the following procedures be adopted:

1. Functional Consulting Engineering Groups should be established within the framework of N.S.P.E. at state and national levels.
2. Recommendations of the Functional Consulting Engineering Groups should be publicized to the membership and adopted by the state and national societies unless contrary to the interest of the profession. With the support of the Society such policies would have a much better chance of public acceptance.
3. N.S.P.E. should publish a Functional Consulting Engineers' Group Bulletin, similar to the Legislative Bulletin.
4. It is recommended that the functional group program be placed in operation immediately. Pending the necessary modification of the Bylaws, it is recommended that one of the standing committees be instructed to carry out this program.

Conclusion

It is believed that functional groups offer the best solution to the problem of adequate representation for consulting engineers for the following reasons:

1. This solution strengthens the profession by preventing further splintering.
2. Since the number of consulting engineers is relatively small, they need a large professional society such as N.S.P.E., to adequately represent them. With weight of the entire employee-employer membership of N.S.P.E. behind the recommendations of the functional group the chances of having these policies accepted by government and the public would be enhanced.
3. N.S.P.E. will be a more successful society with the active support of the consulting engineers.
4. Financing and staffing a new professional society offers many hurdles, whereas financing of functional groups within N.S.P.E. can be handled.
5. The functional group as envisioned would be able to cope with problems involving one or more states.
6. By providing Functional Consulting Engineering Group Programs at state and national levels the consulting engineers will be aided in the solving of their problems.
7. The formation of functional groups will have the desirable effect of promoting unity in the profession.

Board Action:

Approved that: 1. Functional groups may be established within the framework of N.S.P.E. at state and national levels, as need for such groups becomes evident; 2. Recommendations of the functional groups should be publicized to the membership and adopted by the state and national societies unless contrary to the interest of the profession. With the support of the Society such policies would have a much better chance of public acceptance; 3. N.S.P.E. should make provision for functional group pages in the AMERICAN ENGINEER. When required, it should publish functional group bulletins similar to the Legislative Bulletin; 4. It is recommended that pending the necessary modification of the Bylaws, appropriate standing committees be instructed to carry out the functional group programs; and 5. There is an immediate need for a functional group of engineers in private practice. It is recommended that steps be taken to establish and activate such groups at state and national levels as soon as possible.

President Neff directed the Engineering Practices Committee to handle consulting engineer functional group matters pending formal formation of functional groups.

ETHICAL PRACTICES—

Recommendation for Board Action:

1. N.S.P.E. Board authorize Ethical Practices Committee to contact state societies and chapters advising of A. T. & T. conference results, urging continuation of their efforts to recognize Professional Engineers in telephone listings. The Committee to continue work on the problem including enforcement attempts in selected areas.

The program for this administrative year (1955-56) falls into the general problem headings of:

1. Uniform telephone listings.
2. Ethical advertising.
3. Competitive bidding.
4. Further breakdown or explanation of Canons of Ethics and Codes.
5. Education program on ethics.
6. Description of practices of questionable ethics and listing of types of unethical practices.
7. Method of policing ethical practices.

Board Action:

Approved the recommendation of the Ethical Practices Committee favoring continuation of efforts for professional recognition of Professional Engineers in telephone listings.

Approved the recommendation of the Committee authorizing a program of preparation and release for publications of "Articles on Ethical Practices."

Operating and Services Group

RESOLUTIONS—

Resolution 13-55

(Submitted by the Minnesota Society of Professional Engineers)

WHEREAS, it has been the policy of the National Society of Professional Engineers to nominate one candidate for each elective office, and

WHEREAS, the jurisdiction of N.S.P.E. vice-presidents is for all practical purposes limited to the region which each represents,

NOW, THEREFORE, BE IT RESOLVED, that the Board of N.S.P.E. approves in principle the following recommendations and requests their preparation for formal acceptance by the Society.

1. That two or more candidates be nominated for each elective office of N.S.P.E.
2. That voting for vice-presidents be limited to the region in which each serves.
3. That if single nominees are to be placed on the ballot for each office, the mailing of ballots be dispensed with to conserve the funds normally used for this purpose.

Board Action: All recommendations denied.

Resolution 19-55

(Submitted by the New York State Society)

WHEREAS, Bill S. 2373 introduced in the United States Senate June 29th, 1955 by Senator Kerr of Oklahoma is being considered by the Senate Public Works Subcommittee on Flood Control, Rivers and Harbors, and

WHEREAS, a section of this measure would authorize TVA "In connection with the construction of a generating plant or other facilities under an agreement providing for lease or purchase of said facilities or any interest therein by or on behalf of the Corporation, or for the purchase of the output thereof, to perform engineering and construction work and other services, and may enter into any necessary contractual arrangements," and

WHEREAS, the National Society of Professional Engineers has called upon the Senate Subcommittee to eliminate language in the pending measure, which would permit TVA to provide engineering services to outside agencies or organizations if they were to build and operate power facilities or other facilities, with a tie-in to TVA operations, and

WHEREAS, the authorization for TVA to provide engineering services outside its own organization would be an intrusion of a Federal Agency into private professional practice and at variance with the letter and spirit of existing state laws which require that performance of engineering services may be rendered only by qualified individuals licensed in the State to practice professional engineering;

NOW, THEREFORE, BE IT RESOLVED, that it is in the sense of NYSSPE that the Federal Government should not compete with its own citizens in furnishing material or services, particularly with respect to the independent practice of Professional Engineering, and

BE IT FURTHER RESOLVED, that the President of NYSSPE be directed to urge all Subcommittee members and N. Y. State Congressmen and Senators and all members of appropriate Senate and House Committees to oppose the intrusion of the TVA into the field of professional engineering practice; and

BE IT FURTHER RESOLVED, that officers and directors of other member State Societies be urged to take similar steps; and

BE IT FURTHER RESOLVED, that the officers and Board of Directors of NSPE be urged to take any further appropriate action necessary to prevent the intrusion of the TVA into the field of Professional Engineering practice.

Board Action: Adopted.

Resolution 20-55

WHEREAS, the offer and performance of professional engineering consulting services is the proper function and responsibility of qualified professional engineers who have demonstrated their qualification by registration under the state engineering registration laws, and

WHEREAS, the offer and practice of consulting professional services is best performed within the free-enterprise American economy by qualified private practitioners, and

WHEREAS, it is contrary to the interest of the general public for Federal agencies to offer or perform professional services to non-Federal organizations or private individuals or firms, and

WHEREAS, it is fundamental and sound doctrine that government should not provide services which qualified private citizens are able and willing to provide, particularly in the professional fields, and

WHEREAS, there is no justification for Federal agencies to offer or provide professional consulting services to non-Federal organizations or individuals at the expense of the general taxpayers;

NOW, THEREFORE, BE IT RESOLVED, that the National Society of Professional Engineers does and will oppose all legislation or administrative action which authorizes Federal agencies to provide professional consulting services, including the preparation of plans, designs, specifications, reports, studies, and other methods of professional advice, for the purpose of furnishing same outside of the direct responsibility and function of the agency involved.

Board Action: Adopted.

—Education and Professional Development Group—

EDUCATION—

The Committee on Engineering Education has prepared an Outline of Action for the *Advancement of Engineering Education by Cooperative Endeavor of Engineering Faculties and Professional Practicing Engineers.* It is anticipated that the program will initiate closer cooperation between the educational committees of state professional engineering societies, the Education Committee of NSPE and the practicing engineers.

This program anticipated the encouragement and stimulation of individual engineering teachers to:

1. Inculcate high regard for safety, ethics, public and community service, and responsibility in every major engineering course.
2. Encourage creative thinking in each engineering course.
3. Encourage students possessing a high level of engineering ability to pursue graduate studies.
4. Participate wholeheartedly in community and professional life.

It further assumes that administrators of engineering schools will attempt to:

1. Upgrade the quality of students pursuing engineering.
2. Maintain a high level of attainment in the engineering sciences with mathematics as a core to all engineering programs.
3. Encourage modest recruiting in the rural high schools where the percentage entering the engineering college is usually low.
4. Develop more short-term advanced engineering courses at the graduate level.
5. Encourage teachers of engineering subjects to qualify for registration in their respective states.
6. Encourage engineering teachers to engage in current engineering practice during their spare time.

The practicing engineers in the profession will integrate into this program by:

1. Maintaining an alert guardianship of the profession against engulfing graduate engineers in unionism.
2. Encouraging employers to improve the spread of salaries to show a full recognition to employed engineers for years of competent high level service.
3. Offering further education and training in management and other studies to employee graduates to supplement the technical and scientific education of the colleges.
4. Encouraging a fair proportion of engineers on college and university boards.
5. Affording greater recognition of engineering in public and national life.
6. Organizing the registered engineers to campaign actively for an improved level of engineering teachers' salaries.

In summarizing the work of the Education Committee for the past year, seven objectives are proposed to the Society for the current year.

1. That the vocational guidance leaflet be distributed to high school students, teachers, counselors and parents.
2. That NSPE take an active part in programs to improve the teaching of sciences and mathematics education in high schools.
3. That NSPE promote Science Fairs and Engineering Clubs at the State level.
4. That NSPE participate in the White House Conference on Education.
5. That affiliation or cooperative action be established between NSPE and AAAS.
6. That cooperative action be established between State Societies and State Education Associations.
7. That NSPE favor salaries of engineering faculty members comparable to those received by practicing professional engineers.

Further, to assist local education committees on a long-term planning basis in formulating outstanding programs in the field of engineering education, fourteen suggestions are proposed (and listed in a previous report) one or all of which will have lasting effect on the future of the profession. These suggestions were sent to all local and state groups during the past year in an effort to provide some unity in a program of national scope but which must be conducted at the state or local levels.

The Committee also feels the following should be continued on the agenda for future committees until some conclusion is reached:

1. A pilot operation involving a survey of Professional Engineers to provide information of importance to engineering education.
2. Improvement of cooperation between ECPD and NSPE.
3. An effective definition of the profession which will aid in our classification as members of a learned profession.
4. An exploration of educational television as a tool in the learning process.

The pilot study of the profession is intended to determine specifically where engineering education has been weak and where it may have been strong. A questionnaire covering professional needs, what was gained from engineering education, etc. was prepared. If the pilot study appears fruitful, then a subsequent study will cover at least a random sample of the whole profession.

A comprehensive definition of engineering education is proposed:

"The first objective of engineering education is preparation for the performance of the functions of analysis and creative design, or of the functions of construction, production, or operation where a full knowledge of the analysis and design of the structure, machine, or process is called for."

The Education Committee has been concerned with laws for scholarships for engineering and scientific study (the Osmers Bill and the Powell Bill), and manpower considerations as related to the Hinshaw Bill and to engineering education. However, the profession needs no more students until we are supplied with the necessary funds to support the present number of students. Every student who is added increases the financial load of the institution.

This is a report of what has been proposed and in some instances things which have been accomplished. The Committee pledges itself to carry on to conclusion the worthwhile unfinished back-log of projects and will strive to remain alert to the many new problems of importance educationwise to the profession.

Board Action: Approved.

REGISTRATION—

Recommended for Board Action:

1. That NSPE cooperate with other societies, especially NCSBEE and NBER, in the formulation of some plan which will eventually be acceptable by all boards of engineering registration for registration by endorsement.
2. That, since it is almost a unanimous opinion of NSPE members, an oral and written examination should be given each applicant.
3. That NSPE go on record as vigorously opposing the provision in Senate Bill 2373 which allows the Tennessee Valley Authority to use its own or other Federally employed engineers to do engineering work on a project which is not owned by the corporation. (See Resolutions.)

Board Action:

Approved the recommendation of the committee that NSPE cooperate with other societies in the formulation of some plan for registration by endorsement.

Approved the recommendation of the committee re recommendation to NCSBEE of oral and written examinations for those seeking registration.

Approved the action of the Executive Committee at Memphis directing the Registration Committee to draft an ideal registration law.

YOUNG ENGINEERS—

It is quite evident to your Young Engineers Committee that the members of our Society are increasing their interest in young engineers. It is also becoming apparent that we need a much stronger program for these younger men, who will be here in our place in just a few years. The committee last year, in its final report to the Society, called attention to some of our weaknesses. Three of these weaknesses that should have our special attention this year are:

(1) An alarmingly low percentage of membership in the E.I.T. classification.

(2) Lack of an effective program of recruitment for young engineer members.

(3) Failure to encourage full participation of young engineer members in our Society activities.

A number of actions which have already been taken have had a beneficial effect. Others have not really had time to reach full effectiveness. It is apparent, however, that we now need to really concentrate our effort on overcoming these three weaknesses. A goal of our committee therefore will be to formulate a definite program of action for all levels of our Society that we hope will eventually lead to substantial gains in the interest of young engineers in our Society and their membership in the Society.

Of course, we do not now know how this can best be done. We do observe that some state societies have been much better than others in obtaining E.I.T. members. We have reports from these states, and we also want their advice on a broad program of action. We also feel that we need to know more about what the young engineers themselves are thinking, what *they* want, and what they expect of *their* professional society. We do not wish to insinuate that any of us are old enough that we have forgotten the things that were uppermost in our minds when we were young engineers, but it just may be that young engineers today are a little different and they may even be an improvement over what we were. At any rate, we need to get the facts directly from these young engineers themselves.

Board Action: Report approved.

(from page 34) **—Public Relations Group—**

PUBLIC RELATIONS—

Public Relations activity of the National Society, since the annual meeting in June, has been centered around the following basic projects:

A—General Public Relations Activities

1—*Instruction in Mathematics and Sciences in High Schools*

(a) Letters are being prepared to Chapters, outlining steps for conveying to Boards of Education, school administrators, teachers, and parents, the need and the desirability to provide special classes for talented students in Mathematics and Science, which would give them opportunity to develop their full potential in the study of these subjects.

(b) Steps have been initiated to try and obtain foundation funds for an authoritative report on schools which have used special scheduling methods and assigned talented students to special classes in Mathematics and Sciences. It is hoped that such a report will include several methods or techniques used and the results achieved.

2—*Engineering Clubs in High Schools*

Upon direction from the Executive Committee, a number of pamphlets describing the establishment of "Engineering Clubs" in high schools for the purpose of stimulating young people interested in engineering and scientific pursuits were referred to the Public Relations Committee. It is intended to discuss these programs with several school officials in various areas of the country and to obtain their opinions regarding the desirability and the most effective methods of promoting such clubs.

3—*PR Surveys of the Engineering Profession by College Schools of Journalism*

Material is being prepared for distribution to State Societies and Chapters regarding the methods of obtaining PR Surveys by enlisting the support of college classes in Journalism and Public Relations. This proposal, initiated in Texas, was authorized by the Board of Directors last June.

4—*Accreditation to the Department of Public Information of the United Nations*

Following approval by the Board last June, the Executive Director has taken steps to obtain accreditation of the Society to the Department of Public Information of the United Nations.

B—National Engineers' Week

1—*Sponsors*

The nine sponsors of the 1955 Engineers' Week have consented to continue in the same capacity for next year. In addition, we have secured as the tenth sponsor, Dr. Charles Allen Thomas, President of the Monsanto Chemical Company. The list of sponsors is as follows:

Vannevar Bush	Royal W. Sorensen
Allen B. DuMont	Philip Sporn
Charles F. Kettering	David B. Steinman
Clarence H. Linder	Charles Allen Thomas
Thomas E. Murray	Robert E. Wilson

2—*"The National Engineers' Week Story"*

A twelve page booklet entitled "The National Engineers' Week Story" is being prepared by the staff. This booklet is designed to stimulate a participation of the industry in the events of the Week. It outlines its aims and purposes and gives a visual presentation of the activities of 1955. The booklet will be sent to approximately 550 large industrial organizations with a letter inviting their participation in 1956. It will also be sent to various associations, State Societies and Chapters, and other groups.

C—Public Information Activities

Opposition to the Expansion of TVA Engineering Activities

President Neff submitted a letter to the Senate Subcommittee which was holding hearings on a pending TVA bill. This letter voiced strong opposition to a feature of the bill which would permit the TVA to provide engineering services outside of their own organization, thus placing a Federal agency in direct competition with engineering consultants. This letter was given considerable prominence by members of the committee. In addition to a news release describing this step, a special mailing was made to a large list of consulting engineers, various associations, and government officials. The mailing contained a copy of President Neff's letter to the Senate Public Works Committee on Flood Control and an abstract of the committee discussion regarding this letter. The covering letter was designed to enlist additional support for the Society's position when hearings on this measure are resumed.

Board Action: Report approved.

—Interprofessional Relations Group—

INTERPROFESSIONAL RELATIONS—

Recommended for Board Action:

A. Approval of the following documents (copies available from NSPE Hqs.) which were developed by the Interprofessional Relations Committee in collaboration with AIA and discussed with committees of ASCE and ASME:

1. Standard Form of Agreement Between Architect and Engineer—Based on fixed sum fee or percentage of contract cost.
2. Standard Form of Agreement Between Architect and Engineer—Based on expenses plus a fee or multiple of expenses.
3. Standard Form of Agreement Between Engineer and Architect—Based on fixed sum fee or percentage of contract cost.
4. Standard Form of Agreement Between Engineer and Architect—Based on expenses plus a fee or multiple of expenses.
5. Interprofessional Code of Practice for Architects and Engineers.

B. Approval of the following resolution on cooperation between AIA and NSPE which was developed jointly and recommended by the AIA Committee on Collaboration of the Design Professions and the NSPE Interprofessional Relations Committee.

WHEREAS, there are numerous matters of mutual interest existing between the American Institute of Architects and the National Society of Professional Engineers.

WHEREAS, these matters are, in many cases, under study by existing committees of each organization.

NOW, THEREFORE, BE IT RESOLVED: that the Board of Directors of the National Society of Professional Engineers direct their various committees to:

1. Be alert to areas of mutual interest between Architects and Engineers in the spheres of activity covered by each committee.
2. Bring such subjects to the attention of the corresponding committee of AIA.
3. Coordinate their studies and recommendations with parallel committees of AIA so that the two professions may act to their mutual benefit.

Documents numbers 1 to 4 inclusive were received by the Board of Directors at the June meeting and were distributed to all State Societies for consideration. Letters of approval have been received from some State Societies. The Kansas Society reported no basic objection, but felt that three items should be adjusted or clarified for their local use. An individual engineer from New Jersey provided considerable criticism. When contacted personally, he agreed that it would be wise to obtain NSPE approval of the documents as written in order that they can be made available to the professions, and to consider his points for future revisions. This reasoning follows that of the joint committee during the development of the standard forms of agreement.

Document Five, the Interprofessional Code of Practice for Architects and Engineers, was approved at a joint meeting held July 8, 1955, between your committee and the AIA Committee on Collaboration of Design Professions. It is designed to be brief and sufficiently general to be basic in all parts of the country. The joint committee agreed that in reproducing this code that reference be noted to the Canons of Ethics for Engineers adopted by NSPE in 1946, and the Standards of Professional Practices adopted by AIA, document number 330—revised June, 1954.

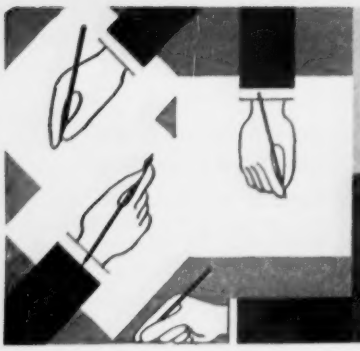
The July 8, joint meeting of your Interprofessional Relations Committee with the AIA Committee on Collaboration of the Design Professions developed a very cordial and cooperative relation. In addition to the work accomplished on the documents, it was agreed:

1. That both AIA and NSPE should instigate or encourage activities of state and local interprofessional relations committees.
2. That there should be an interchange of information on legislative matters between the two organizations at each level.
3. That areas of mutual interest to AIA and NSPE be pursued by joint work of the proper committees and that there be coordinated action in implementing the decisions reached. A resolution on this cooperation was approved by the joint committee and recommended for action by the Boards of each organization.

Board Action:

1. Documents approved.

2. Resolution approved.



Professional POSTSCRIPTS

In sending along the following article from the "Engineer Placement Guide," R. L. Sweigert, Dean of the Graduate Division, Georgia Tech, had this to say: ". . . I am in accord with the general idea pointed out in (this) article entitled, 'Needed Engineers Found Tied to Executive Desks.' . . . I continually advance the idea that if engineering is going to be a worthwhile profession it must be able to stand on its own feet." Right! and so, we are pleased to print the "Guide" piece.

—PP—

Despite continuing absolute increases in the numbers of engineering graduates in almost every category, the demand for engineers continues to outpace the supply by a considerable margin.

One of the answers available to the nation, and to the individual firm suffering from the engineer shortage, lies in more efficient utilization of existing engineering talent.

One manner in which top engineering talent is frequently wasted by many firms is, strangely enough, deserved promotion. Many engineers, old and young, by proving their ability, earn promotions which are not in the best interests of their employers and, frequently, not in the best interests of the engineers themselves.

Such promotions, however richly deserved, often result in removing a highly creative engineer from the ranks of the "doers" and placing him in a position where his duties are largely or entirely administrative. The temptation for the engineer, to leap at such an opportunity to move into the administrative ranks is, admittedly, great. The move usually promises additional prestige and greater security—both powerful motivating factors.

However, the move may not be in the man's own best interests as pointed out earlier. A man whose training and natural qualifications have led him to be successful in the creative field of engineering is likely to feel "cramped" in a post which provides little or no outlet for his creative inclination. If this predictable feeling develops, his performance in administration (even though he may also have distinct ability in this direction) is likely to suffer.

For the company which hands out this type of promotion as a reward to deserving members of the engineering staff, the cost is even higher. When a talented and creative individual is removed from the ranks of the "doers" and placed among the administrators, the company which so promotes him:

1. Creates another hard-to-fill engineering vacancy.

2. "Sterilizes" a potential source of valuable creative ideas.

3. Risks losing a valuable man altogether since there is a definite possibility that the man (accustomed to adequate opportunity for creative thought and the thrill of positive creative achievement) will grow rapidly dissatisfied in a position involving mainly administrative routine.

4. Gets an inferior administrator for its salary dollar since the "idea man" is not necessarily talented at administrative detail and, quite probably, is bored by it.

Particularly when the young engineer is rewarded by such promotion does the company's (and the nation's) economy suffer. Studies have shown repeatedly that most significant new ideas are generated at an early age. Further, the young man usually lacks the degree of mental maturity so essential to top performance in an administrative post.

As Dr. R. H. Felix, director of the National Institute of Mental Health, recently pointed out: "A mature leader is generally a constructive person who has experienced the various development phases. His goals are clear, his thinking realistic. The working climate under such a person is generally very wholesome. He cultivates the talents of his group and, in turn, graciously accepts their support. When crises arise, they are met with a minimum of over-reaction."

The older man in an administrative post, Dr. Felix points out, is usually able to draw upon an accumulation of personal knowledge and experience which the younger man simply doesn't have. Meanwhile, the younger man is more likely to produce valuable new ideas if he is left in a position giving scope to his creative talents.

It would appear that the company wishing to reward a deserving engineer would do better—for the company, the country and the individual himself—if some other form of reward can be devised and the administrative spot filled by an older employee or by a business administration graduate.

The engineers who, today, occupy positions involving mainly administrative duties, would go far toward solving the current shortage.

—PP—

"The Story of John," might be an appropriate title of the following article written for —PP— by Engineer Frank W. Brands of Akron, Ohio. But John's story is not unique; indeed, it is one that is all too familiar these days. Here is Engineer Brands' contribution.

—PP—

The September issue of the AE contains two articles which inspire this letter. They are:

On page 20 under the headline "U.S. Publishers Back Neff's Plea for Math Study" and on page 35, "N.S.F. Survey cites Manpower Shortage in New Report."

The same hail and cry has been the subject of a legion of similar articles in recent years. While I am no less appalled at the situation, and stand in full sympathy with the plea, methinks the responsibility for the development of this disturbing condition lies somewhere other than with the men and students who would aspire to engineering or science.

Scientific thinking demands that, rather than merely vociferously decrying the condition, we examine the facts and endeavor to find the cause. Experience shows us that when a cause is clearly understood, our efforts toward controlling the effect prove substantially more fruitful. Therefore I humbly submit the following thoughts as being extremely pertinent in the cause of the present shortage of technical men.

To wit:

It is for every young man to carefully consider the ramifications of the course through life which he would plan to follow, for he is given but one life to use. While it is true that some choose to neglect this responsibility to themselves, such people may be called reckless, yea even fools, and therefore are in general probably not good scientific timber. Therefore let us consider those who indulge in substantial forethought before they point themselves in a specific direction. For convenience, let us call our hypothetical subject, John.

John is an intelligent lad who has the capacity to follow a scientific or engineering career. Furthermore, his personal interests run favorable to this sort of career, and all other factors neglected, John would indeed choose such a course.

But John is also a human being, and as such he also has the normal desires of a young lad to procure that flashy convertible on the lot down town, maybe to entertain his lady friends. He might dream also of a motorboat, and a nice home of his own. John indeed would like to be an engineer, and although he also desires these material goods, he is not in an overwhelming hurry, and he is not blinded by the flashy chrome plate to the extent that he would recklessly sell his future for a mere king size mess of pottage.

Being of scientific mind, John breaks out his pencil and paper and makes some notations, as follows.

The pursuit of an engineering education requires a minimum of four years of college training. This will cost him something on the order of $2000 per year. The total cost, if he lives very frugally, will run approximately $8000, not to mention four years of very rigorous studying, burning considerable midnight oil, and forsaking many an evening of youthful fun.

When John graduates, he will get a job in one of the industries which have been crying so loudly for engineers. His initial wage will be maybe $4000 per year. Perhaps ten years later, his wage will be $10,000 or $15,000 per year. If he is extremely successful (as are a very small percentage of even the present number of engineers, in the midst of this great shortage) his income may be several times this amount. Before taxes, that is.

So John is not afflicted with barrel vision, and therefore proceeds to investigate other possible careers for comparison. He decides to investigate some of the trades, the lot of the operating engineer, or the bricklayer for example.

He finds that within a very short period of time after graduating from high school he can be earning $2.50 per hour as an apprentice bricklayer. In two or three years he can be a master bricklayer earning $4.50 per hour. A rapid slide rule calculation transforms these figures into a starting wage of $5000 per year, and in three years his annual income could be $9000. In four years he can have earned more than $30,000, and have an annual income of $9000.

Comparing these two careers, John figures that his Bachelor's Degree will cost him not only the $8000 in actual cash outlay, but since in the same period of time he could have earned $30,000, the total cost to him in $38,000. Furthermore, at the end of four years, with a degree he will start in earning $4000 per year, and if he learns to lay bricks instead, he can be earning twice that amount. Before his annual income as an engineer would equal his annual wage as a bricklayer, an additional 7 or 8 years are required, during which time, as a bricklayer he would earn an additional $20,000. John would now be approximately 30 years old.

To follow an engineering career would have cost him by now $8000 plus $30,000 plus $20,000, or approximately $60,000 not counting any interest, which he could have made laying bricks. Furthermore he would have had very little free time to enjoy life. Four years of concentrated studying at college, and later, evening study to keep abreast of the rapidly expanding field, together with the mental strain of great responsibility, would have taken their toll. Such a life is extremely conducive to ulcers and chronic headaches.

As a bricklayer, his responsibility would end when the whistle blew. Right from the start he would enjoy a comfortable income together with a generous portion of free time.

The score is quite clear to John by now. He would like to lean toward engineering, but the price is very high.

So this I submit as a major factor in the cause of the declining number of men who would aspire to a technical career. If we genuinely want more scientists and engineers, we must correct this overwhelming economic unbalance. The American people must be educated to this need. And . . . the N.S.P.E., is in an excellent position to pick up this banner and run with it.

—PP—

Now that summer vacations are a thing of the past, and with football games and auto trips lessening as November rolls along, how about penning a —PP— some night in front of the fireplace? Remember, writing isn't nearly as difficult as one might think. Try it.

North Dakota Society of Professional Engineers—Annual Meeting, November 4-5, 1955, Dickinson, North Dakota.

Arkansas Society of Professional Engineers — Annual Meeting, November 18, 1955, Marion Hotel, Little Rock, Arkansas.

Alabama Society of Professional Engineers—Annual meeting, December 9, 1955, Birmingham, Alabama.

Idaho Society of Professional Engineers—Annual Meeting, January 20-21, 1956, Boise Hotel, Boise, Idaho.

Kansas Engineering Society—Annual Meeting, January 20-21, 1956, Baker Hotel, Hutchinson, Kansas.

Texas Society of Professional Engineers—Annual Meeting, January 25-27, 1956, Edson Hotel, Beaumont, Texas.

Wisconsin Society of Professional Engineers—Annual Meeting, January 26-28, 1956, Schroeder Hotel, Milwaukee, Wisconsin.

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233).

Of American Engineer published monthly at Baltimore, Maryland, for November, 1955.

1. The names and addresses of the publisher and editor are: Publisher, National Society of Professional Engineers, 1121 15th St., N.W., Washington, D. C.; Editor, Kenneth E. Trombley, 1121 15th St., N.W., Washington, D. C.

2. The owner is: National Society of Professional Engineers, 1121 15th St., N.W., Washington, D. C.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relations, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semi-weekly, and tri-weekly newspapers only.)

KENNETH E. TROMBLEY, Editor

Sworn to and subscribed before me this 8th day of September, 1955.

(SEAL) MILTON F. LUNCH

(My commission expires September 14, 1957)

Consulting

(Continued from page 22)

other organizations; and expenditures which are directly or indirectly chargeable to new business.

Financing is another business-type problem. The receipt of fees is often slow; sometimes no money is received until plans and specifications are complete. An adequate financial reserve, good credit arrangements, or both, are essential because payments for payrolls and other expenses must not be deferred.

Numerous cases of failure or lack of growth of private engineering practices can be directly attributed to the engineer's failure to become an efficient executive. One condition which often contributes to ineffective administration is characteristic of persons with engineering training. This training teaches them to be thorough and somewhat distrustful of work done by others and makes it difficult for them to delegate to employees the work which is being done in their name. Such delegation is essential to proper management.

Another cause for failure is improper allocation of the consulting engineer's own time. The cost of maintaining an adequate staff creates a natural concern about sufficient work to keep it busy. Unless he can control this concern, the consulting engineer is likely to devote too much time to obtaining new work and neglect the work that is presently under way. The result is poor work and the client's recognition that he is receiving poor service.

If an engineer has considered the requirements for conducting a private practice, if he has recognized that once he has entered such a practice both he and his family will become its slaves, and if he still believes that it is the type of endeavor upon which he wishes to embark, he must then consider how to accomplish the embarkation. Some new practices are started because of circumstances which do not involve much planning. Many others fall between these two extremes.

Important considerations for starting a new practice in a particular location include its desirability as a place to live; the extent and capabilities of existing competition; the potential demand for engineering services; and, to the extent possible, the reaction of potential clients to the abilities, personality and ideas of the aspirant. Very few engineers have been blessed with favorable answers to all of these considerations when starting their practice, but at least a majority of the conditions should be favorable.

Numerous practices have been created without much preliminary planning when engineers who have not previously given much consideration to establishing a private practice have encountered conditions which indicated that such a field of endeavor would be profitable. Under these conditions, much of the investigation required for a planned organization is not necessary. It is important to note, however, that a large number of these practices have failed because the individuals were not prepared, could not properly evaluate the apparent conditions, or were unable to adjust to the requirements.

Another way of entering the field of private engineering practice is to become a partner in an existing organization. This approach requires considerations that are equally as serious as those required for starting a new practice. Regardless of his ability, no engineer should reasonably expect to be accepted as a partner by a man who has endured the rigors, disappointments, hard work and privations of creating a practice unless the partnership will provide a way to improve conditions for that man. However, there are many consulting engineers who would welcome an opportunity to relieve themselves of a part of the burden of conducting their practices. They would welcome a capable junior partner who is convinced that he can improve the revenue to be derived from the existing practice, and is willing to risk financial loss and hardship to prove his conviction.

ANYONE interested in private engineering practice would do well to study the organization and operations of consulting engineers with whom he is acquainted and compatible. He should look for ways by which his services would provide for expansion or improvement of the operations of the existing practice to an extent that would more than compensate for his own remuneration. If he can find such ways, if he is convinced that his ideas are practicable, and if he is willing to risk the possibilities of remuneration upon the success of his plan, he should offer his services as a partner. The offer should include a presentation of his plan and the proposition that his compensation is to be derived from the improved conditions. In making this offer he must be aware that it includes a large element of chance, and he must be willing to take that chance. This is not an unreasonable requirement because the chance is usually not nearly as great as that involved in the creation of a new practice.

Because of approaches by the type of individual who offers nothing but his own evaluation of his services in return for a guaranteed income, the consulting engineer may not be immediately receptive. But, if the plan has merit, he will be aware of its potential and will listen. His reaction will depend upon the soundness of the plan and the sincerity of the individual. Even if the proposal is not accepted, the aspirant will suffer no great loss and he will have learned a great deal about conducting a private engineering practice.

Undoubtedly, this approach will be looked upon with skepticism by many. Those skeptics who are interested would do well to talk with consulting engineers and find the large number who are concerned because of their inability to obtain the services of alert individuals who are competent as both engineers and administrators. Strange as it may seem, the hardest spots to fill in the organization chart of most consulting engineers are those at the top.—***End.***

About the Author . . .

Mr. Ryan

Alfred J. Ryan of Denver is well known in consulting circles, particularly in the West. He is a graduate of the University of Colorado, from which he received a B.S. degree in civil engineering with special honors in 1933 and a C.E. degree in 1937.

He has been in consulting practice since 1941, first as a partner in the firm of Crocker & Ryan, and since 1949, as head of his own firm. He has provided engineering services for highways in Colorado, Oklahoma, and New Mexico, and for various military installations and Federal housing projects.

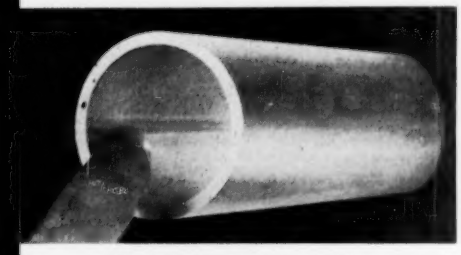
Mr. Ryan is a former vice president of the National Society of Professional Engineers, and he is active in many other engineering, professional, and civic groups.

NEW Processes . . .

Patented Welding Process Controls Bead Contour

A new welding process has been developed and patented to manufacture welded stainless steel and high alloy tubing and pipe. U. S. Patent No. 2,716,692 issued recently to Trent Tube Company, East Troy, Wisconsin, a wholly owned subsidiary of Crucible Steel Company of America, covers this method of manufacturing welded tubing and pipe.

The new welding technique, in which the weld bead contour can be closely controlled, has resulted in many improvements in tubing and pipe from the metallurgical as well as the mechanical aspects. Desirable conditions result, both in the I.D. and on the O.D., without producing grooves, valleys or undercuts in the weld area after cold working or drawing. The O.D. weld bead can be held uniform and smooth so a surface finish can be obtained similar to the surface of the originial parent metal, thereby making it possible to reduce the weld bead by swaging and improve the mechanical properties without undesirable side effects. Heavy wall tubing and pipe will meet all the mechanical tests, such as flare, transverse, tensile and reverse bend.



High alloy tubing showing smooth inner surface of weld bead.

The new tubing and pipe have much better fabrication properties in the production of tube assemblies, heat exchangers, condensers and boilers. The extremely smooth inside offers a better surface for the rolling in of tubes in tube sheets. Many of the high alloys or super alloys can now be rolled into tube sheets, while previously they had to be welded in.

Corrosion resistance has been improved because the absence of valleys or grooves simulating an undercut condition, leaves no place for solids or corrodants to become entrapped.

Underground Roof Separates Park From Parking Garage

Build a building skyward and you top it with a roof. Start a building 70 feet below the surface and build it up to the ground level, and you do the same thing. But the roof-building problems are different.

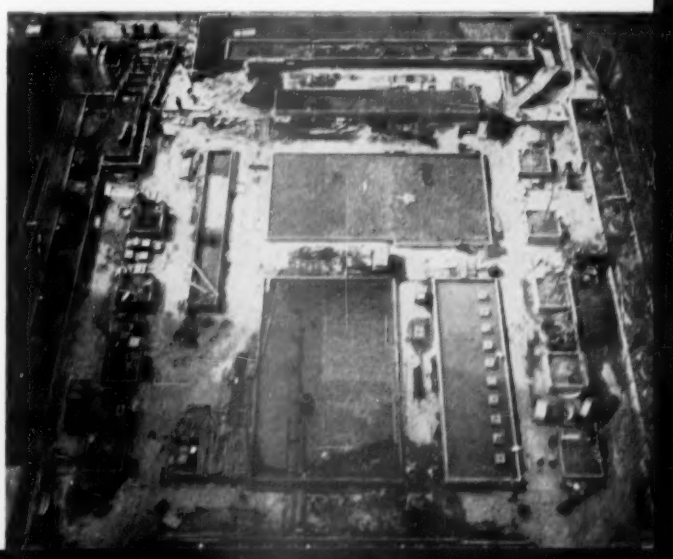
Take, for instance, Pittsburgh's new Mellon Square Park now ready for formal dedication. To the 290,000 persons who daily come into the city's Golden Triangle, it's a lush green garden surrounded by tall buildings. It has 45-foot trees, rhododendron, spruce, broad marble sidewalks, a sparkling fountain, and a green tile cascade down which water flows level by level. But, to the same persons it is also a major means of helping solve the automobile parking problem of a busy city. For beneath the serenity of the square lie six stories of parking space—enough for 900 cars—protected by a block-square roof sturdily resistant to the ground acids and water from above.

Mellon Square Park and Garage is the first of its kind east of the Rockies—the third in the nation. Like its West-coast counterparts in Los Angeles and San Francisco, it has a tarred-felt and tar pitch roof—specified because of its excellent waterproofing qualities and supplied by the Tar Products Division of Koppers Company, Inc. Warren-Ehret Company, of Pittsburgh, in consultation with Koppers sales engineers, developed the intricate roofing job. This is how it was laid:

The waterproofing treatment was applied over the entire area of the park proper, in five plies of tar-impregnated fabric and six alternating layers of tar pitch. In addition, under the fountain and cascade areas, and under all tree baskets and planters, two extra plies of fabric and a layer of waterproof concrete were applied. For the roofing over the storerooms, six of which front the west side of the square, four plies of tar-treated felt were alternated with five layers of pitch.

Because of the particularly rigid specifications for waterproofing the site—which measures 230′ x 260′—a total of 115,400 pounds of pitch, 59,000 square feet of fabric, and 12,000 square feet of felt were used to complete the job.

Drainage of the surface area itself complicated the problem. For in the arrangements to provide both individual sprinkling systems and drainage for each planter and to provide for recirculation of the fountain and cascade water, some 200 separate drains or sleeves had to be separately waterproofed. Added to this was the especially stringent waterproofing requirements of the electrical circuits installed to provide night illumination for the park and fountain. Finally, the design of the stairways made it necessary to have an intricate lapping of the plies of fabric along the edges.



Pittsburgh's Mellon Square Park, during roofing and waterproofing stages. The large rectangle in left foreground has a layer of Koppers tar pitch. Just to the right, finishing touches are put on a ply of waterproof concrete. Planters and tree baskets are being completed. Beneath are six levels of underground parking space, accommodating 900 cars.

STRICTLY BUSINESS

Personalities . . . **S. A. Guerrieri,** formerly chief process engineer of **Arthur G. McKee and Company,** has been appointed to the technical staff of **The Lummus Company,** New York City, according to **J. F. Thornton,** president. . . . **William L. Clark** has been appointed product manager of **ALCO Products, Incorporated's** ALCOPLATE process. He will make his headquarters at the firm's Dunkirk, N. Y. plant. . . . **Goodkind and O'Dea,** Consulting Engineers, with offices in Bloomfield, N. J., Hamden, Conn., and Malverne, N. Y., have announced that **Herbert Goodkind** has become associated with the firm. . . . **Robert M. Van Tassel** has been appointed head industrial designer for **Joy Manufacturing Company,** attached to the Pittsburgh executive staff, according to **John D. Russell,** vice president of engineering. . . . The board of directors of **John M. Avent & Associates, Inc.,** Consulting Management Engineers of Atlanta, Ga., has announced the following changes in the organization due to the death of the president, **John M. Avent: J. S. Creel** has now been appointed president, and **Edward B. Russell** has been named vice president. . . . The appointments of **Howard D. Kurt as** product planning specialist and of **Alton J. O'Neil as** marketing research specialist for the Distribution Assemblies Department of the **General Electric Company** in Plainville, Conn., have recently been announced.

Mr. Guerrieri

Dr. Harold Vagtborg, president of **Southwest Research Institute,** San Antonio, Tex., has announced the appointment of **S. H. Simpson, Jr.,** former manager of communications research, to the position of assistant vice president, concentrating on coordination of the Institute's research program for industry, business, and the military services. . . . **Paul J. Richartz** has been named chief engineer and **Stuart C. Plettner** has been named chief camera development engineer of **Bell & Howell Company,** Chicago, according to **Malcolm G. Townsley,** vice president of engineering. . . . **Erwin J. Campbell** has been appointed supervisor of process research, Research and Development Department, **Acheson Colloids Company,** Port Huron, Michigan; and **William M. Oliver** has been named process development engineer at the Port Huron plant. . . . **John H. Quinn, Jr.,** has joined **TEMCO Aircraft Corporation,** Dallas, Tex., as chief of technical services, a new position in the firm's Engineering Department. . . . **Daniel T. Gunderson** and **Lloyd E. Schumacher** have been named vice presidents of the **J. B. Rea Company, Inc.,** electronics firm of Santa Monica, Calif. The former is now vice president in charge of engineering and production; the latter, in charge of sales and customer relations.

Mr. Richartz

Rear Admiral Harry B. Temple, USN (Ret.), has been named assistant vice president of **Robertshaw-Fulton Controls Company** and will make his headquarters in the firm's Washington, D. C. office. . . . **Westinghouse Electric Corporation** has named **Romus Soucek** as manager of defense products for the West Coast; his office will be in Los Angeles. Also, **P. T. Lagrone** has been appointed manager of electric utility sales for the Pittsburgh corporation. . . . **William A. Loumos** has been appointed district engineer for **The Austin Company's** eastern district, with headquarters in Roselle, N. J. . . . **Atlantic Compound Company** of Waterbury, Conn., has named **William R. McFarland,** president and general manager. . . . **Theodore F. Smith** of Pittsburgh, Pa., has joined the **Kaiser Engineers Division** of **Henry J. Kaiser Company** as an industry consultant; he will maintain offices at the firm's regional headquarters in Pittsburgh.

New Firms . . . **George S. Richardson** of Pittsburgh, has announced the formation of a new consulting partnership—**Richardson, Gordon and Associates.** The new firm, which involves no changes in personnel or types of work handled, represents a combination of the offices of **George S. Richardson,** established in 1939; **Richardson and Gordon,** a partnership formed in 1951; and **Richardson, Morehouse, Ramsey, and Fisher,** a partnership organized in 1952. In addition to **Mr. Richardson,** who is senior partner, and **Bennett T. Gordon,** who is resident partner in the firm's Philadelphia office, other partners are **James H. Morehouse, James C. Fisher,** and **Philip B. Ramsey. Louis T. Shannon** is chief engineer in the Pittsburgh office, while **Sydney A. Martin** holds the same position in Philadelphia. Others with the firm include: **Henry L. Wojcik,** electrical engineer; **Gerald A. Oakes,** soil engineer, **John V. Miller, Jr.,** traffic engineer; **Charles W. Dibert,** chief of surveys; and **Willis A. Bryan,** project engineer. Offices are at 3 Gateway Center, Pittsburgh, and 1411 Walnut St., Philadelphia.

Mr. Richardson

Announcement has been made of the formation of **Kelley, Gidley & Staub, Inc.,** Consulting Engineers, with offices at 5418 MacCorkle Ave., S.W., Charleston, W. Va. The firm will offer services for all civil and sanitary engineering projects and will specialize in the water supply and sewage treatment fields. Principals in the new organization are **W. D. Kelley, Harry K. Gidley,** and **William S. Staub.**

Location Changes . . . **Herbert B. Addington,** head of the firm of **Herbert B. Addington and Associates,** successor to **Myers & Addington,** Consultants in Steam and Power, has announced the removal of his office from New York City to Pleasantville, N. Y., in the metropolitan area. . . . **Otto J. Sambach** and **Warren A. Sambach,** consulting engineers, have announced the removal of their office to 216-22 Jamaica Avenue, Queens Village 28, N. Y.

With Our Members . . .

From Illinois

Congressman Price Urges Promotion Of Engineering Education

The encouragement of more young people to take up engineering and scientific careers will be the heart of the solution to technological rivalry with Russia, according to the Honorable Melvin Price, a member of the United States House of Representatives, who was the guest speaker at the October 10th banquet meeting of the St. Clair Chapter of the Illinois Society of Professional Engineers.

Speaking at the Broadview Hotel in East St. Louis, Ill., the Congressman, who had only recently returned from Geneva, Switzerland, where he was an observer at the Atoms for Peace Conference, discussed the development of the atomic programs of the various nations.

"Economic historians say that the country with the best pool of scientific and technical manpower is the country that leads the world technologically and industrially," he said. "There is no automatic guarantee that the United States will continue to lead the world industrially. Such leadership will be ours only if we continue to earn it—only so long as our program for training scientific and technical brainpower is the best."

Members of other engineering societies, the other professions, and business, civic, and industrial leaders of the area were invited to attend the meeting at which Congressman Price gave his impressions of the Geneva atomic parley. Among the guests was Dwain M. Wallace of Peoria, president of the ISPE. Raymond G. Brichler, a past president of the Illinois Society, was program chairman in charge of arranging the meeting.

Coleman Addresses New York Group

John D. Coleman, chairman of the Professional Engineers Conference Board for Industry and a former president of NSPE, was the guest speaker at a recent meeting of the Monroe Chapter of the New York State SPE. The subject of his address was *The PECBI Story*.

Robert Allen, vice president of the Shuron Optical Company, Rochester, and a member of the Conference Board, was chairman in charge of the meeting, which was held at the Hotel Rochester.

Soil Lecture In Tulsa

R. A. Helmer, research engineer with the Oklahoma Highway Department at Oklahoma City, was the guest speaker at a recently reported meeting of the Tulsa Chapter of the OSPE. Mr. Helmer, who served as a special soils and foundations consultant in connection with the design and construction of the Turner Turnpike, spoke on *Some Interesting Aspects of Soils*.

Dr. H. S. Rogers Honored In New York

Dr. Harry S. Rogers, president of the Polytechnic Institute of Brooklyn, was the honored guest at the annual dinner of the New York Chapter of the NYSSPE recently. The chapter's Award for Distinguished Service was presented to Dr. Rogers in recognition of his outstanding leadership in engineering education and in advancing the engineering profession. Frederick H. Zurmuhlen, New York City Commissioner of Public Works, made the presentation.

Officers and directors of the New York Chapter were also installed during the meeting by Herbert F. Roemmele, president of the NYSSPE. Elias Elvove, chapter president, acted as toastmaster.

Chapter Backs Student House

Newly opened at the University of Texas, Austin, is a cooperative house for engineering students, which was leased and organized through the efforts of the Travis Chapter of the Texas SPE, with the financial cooperation of the Ladies' Auxiliary.

The house will provide living quarters for twenty-nine engineering students at a rate of $50.00 per month.

Frank Elam, a petroleum engineering student, has been appointed acting president of the cooperative. B. F. Treat and T. K. Wood comprised the Travis Chapter's special Cooperative Committee, while the Ladies Committee was composed of Mrs. Sara Holmes, Mrs. Wanda Thompson, and Mrs. Myra Rigsbee, with Mrs. Phillippi, auxiliary president, as chairman.

. . . more news on page 43

UNION COUNTY P.E.'S OF DISTINCTION—Members of the Professional Engineers Society of Union County, an affiliate of the New Jersey SPE, held a testimonial dinner recently in Springfield, N. J., to honor their past presidents. The photograph at the left, below, shows the honored guests. Seated, left to right, are Joseph M. Veretta, Stephen Negry, James J. Kane, and E. Ray Hardie. Standing are Edward R. Boate, Philip H. Oppenheimer, Reuben N. Olson, Irving Mencher, and Clifford W. Zimmer. Each past president has also been presented with a plaque in recognition of his service to the chapter.

A second highlight of the banquet meeting was the installation of new officers. In the picture at the right, Frank Cooper (left), incoming chapter president, is shown accepting the official gavel from Vice President Earl Christian of the New Jersey Society.

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North Shore P.E.'s Plan Student Banquet

Consideration is being given by members of the North Shore Chapter of the Massachusetts Society of Professional Engineers to the sponsorship of a banquet during National Engineers' Week at which engineering students in the area would be entertained as guests of the chapter. A program featuring a popular lecturer, plus discussions of society activities, would also be provided during the evening. The main purpose of the event would be to promote interest in both technical and professional societies among students about to graduate from their engineering courses.

A survey of the chapter membership is now being taken to determine interest in proceeding with the project.

Michigan Record

The Michigan Society of Professional Engineers has set a record with the formation and chartering of five new chapters between July 1, 1954, and June 30, 1955. This brings the total number of Michigan chapters to fourteen. In addition, another newly-established P.E. group is awaiting its charter from the MSPE board of directors, while two other chapters are also in the process of organization.

The work of organizing the new groups was undertaken under the direction of the 1954-55 president, Wesley Bintz of Lansing. Mr. Bintz is now a national director of NSPE.

Arrowhead Chapter Is Host To MSPE Board

Members of the Arrowhead Chapter of the Minnesota SPE were hosts to the State Society's board of recently for a day-long business and social meeting at the Duluth Athletic Club.

Among the business items considered by the board were: the planned membership drive, a revision of the MSPE Constitution and Bylaws, a progress report of the Education Committee, and plans for the sponsorship of "Registration" Meetings by the Junior Engineers' Committee of each chapter.

. . . *more news on page 45*

KEY TO CITY — NSPE President Allison C. Neff (second from left) is shown here accepting a glass key from Mayor Ollie Czelusta of Toledo, Ohio, before he addressed a recent meeting of the Toledo SPE. Seated at the left is William C. Turnbull, state trustee, while Thomas B. Henry, TSPE president, appears between Mr. Neff and Mayor Czelusta.

The subject of Mr. Neff's address was "Professionalism in Action in a Three-Level Organization."

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Kansas Water Supply Is Lecture Topic

W. E. Steps, chief engineer in charge of watershed investigation for the State Division of Water Resources, was the guest lecturer at a recent meeting of the Smokey Valley Chapter of the Kansas Engineering Society. Speaking on *Kansas Water Resources*, Mr. Steps, who is also director of publications for the Society, told the engineers and their guests that supplies appear to be adequate for the immediate future.

He also discussed various conservation problems, steps taken for their solution, and flood control. He used charts and maps to illustrate his lecture.

Indiana Officers Speak At Lafayette Meeting

C. F. Falkner, president of the Indiana SPE and also of the Materials Handling Company of Indianapolis, was the principal speaker at the October 13th dinner meeting of the State Society's Lafayette Chapter. Mr. Falkner discussed NSPE activities at the national level.

A second speaker—Henry Estergreen of Lafayette, ISPE president-elect—discussed state society organization, explaining how professional service is rendered at the state level. The final speaker—Fred Morse, president of the Lafayette Chapter—discussed professional service at the chapter level.

San José News

Several interesting meetings have been reported recently by the San Jose Chapter of the California SPE. The September meeting took place at the North American Aircraft Company's Modification Plant in Fresno, where the members and their guests had dinner and made an inspection tour of the manufacturing facilities. A plane was chartered to fly the group from San José to Fresno.

Congressman Charles S. Gubser was the guest speaker at the chapter's October meeting, discussing the current political situation.

Another Congressman—Claire Engle—is scheduled to be a participant in the program for the November meeting as a member of a panel that will discuss State water problems.

FEBRUARY PLANNERS — The engineers in the photo at the left are shown as they made initial plans for the observance of National Engineers' Week in Wisconsin during the recent WSPE Summer Conference at Lake Delton. They are, l. to r., Donald C. Bengs, R. M. Lyall, Victor A. Kneevers, Arthur H. Graettinger, and Leo F. Kosak.

. . . more news on page 46

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Smog Experts Speak In California

Approximately one hundred members of the California SPE attended a recent dinner meeting sponsored by the Pasadena area P.E.'s, at which the smog problem was discussed as one of the features of the evening's program.

Following the dinner, Dr. Royal W. Sorenson, California Tech professor emeritus of electrical engineering, acted as moderator for a four-man panel of experts who presented their views on the smog situation. Those taking part were: Rober Chass, chief of the Evaluation and Planning Division of the Air Pollution Control District; Frank E. DeMartini, regional engineer, U. S. Public Health Service; Dr. Lawrence Faith of the Air Pollution Foundation; and Gerald Fisher, chemical engineer with the General Petroleum Corporation and representative of the Western Oil and Gas Association.

Georgia Board Meets In Scenic Setting

The officers, directors, and committee chairmen of the Georgia Society of Professional Engineers enjoyed a meeting in a unique scenic setting recently. They assembled at the summer home of President Henry K. Burns, Jr., on Whiteside Mountain to enjoy a relaxing weekend and also to discuss GSPE programs and activities. Among the items discussed was the question of establishing ladies' auxiliaries to all chapters.

Management Selection Discussed in Wisconsin

F. L. Larkin, vice president of the Wisconsin Electric Power Company, was the guest lecturer at the October 8th meeting of the Fox River Valley Chapter of the Wisconsin SPE. Mr. Larkin chose as his subject, *Selecting Future Management.*

The meeting was held at the Elk's Club in Appleton. Area members of the American Institute of Electrical Engineers were also invited to attend.

Regional Planning Is Meeting Topic

Leroy L. Little, director of the Montgomery County Planning Commission in Pennsylvania, was the featured speaker at a recent dinner meeting of the Reading Chapter of the PSPE. Mr. Little's subject was *The Engineering Profession and Regional Planning*, a topic of particular interest because city and regional planning is much in consideration in the Reading area.

At another recent meeting of the Reading P.E.'s, Dr. M. V. Ziegler, regional medical director for the Pennsylvania Department of Health, spoke on the subject, *Environmental Sanitation on the County Level.*

Week

(*Continued from page 24*)

The slides can be shown during TV station breaks as public service announcements.

The set of five one-minute TV films can also be shown at stations breaks. The films, directed by a noted documentary film director, were produced by Capital Film Studios in Washington, D. C. They feature experienced network television announcers.

The films emphasize the professional nature of engineering, and point up through scale models and photographs the importance of the engineer in the development of such things as atomic energy, space satellites and rocketry, radar, transportation, and construction.

One of the films shows an actual scale model of one of the proposed MOUSE satellites which was made by students of Dr. Fred Singer, the University of Maryland physicist and graduate engineer whose plans and calculations for the satellite project have received widespread notice in general and scientific publications.

Because of the current popular interest in rockets and space satellites, the tape recorded radio program this year was based on the theme, "Project Satellite—An Engineering Step to Outer Space."

This 15-minute program tells the dramatic story of the engineering behind the whole satellite project. It features an actual recording of Presidential Press Secretary James Hagerty making the White House announcement last summer that the U.S. would build and launch the satellites as part of this country's participation in the coming International Geophysical Year.

Also on the program is a tribute to the engineering profession by Dr. Singer.

NOVEMBER MEETINGS Of Note

American Council of Independent Laboratories, Inc.—Annual Meeting, Nov. 8-11, Hotel Westward Ho, Phoenix, Arizona.

American Society of Mechanical Engineers—Diamond Jubilee Annual Meeting, Nov. 13-18, Congress, Conrad Hilton, and Sheraton-Blackstone Hotels, Chicago, Illinois.

Institute of Radio Engineers — Symposium on "Communication by Scatter Techniques," Nov. 14-15, George Washington University, Washington, D. C.

American Public Health Association—Annual Meeting, Nov. 14-18, Municipal Auditorium, Kansas City, Missouri.

Armour Research Foundation—Conference on "The A-Bomb and Industry—A Prescription for Survival," Nov. 17, Illinois Institute of Technology, Chicago, Illinois.

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—AE—

BOILER TUBE CORROSION—"Eleven Ways to Avoid Boiler Tube Corrosion" is the title of a recent publication by the Tubular Products Division of The Babcock & Wilcox Company, Beaver Falls, Pa. This 8-page folder contains important data resulting from an extensive study on the part of Babcock & Wilcox metallurgical staff. Many of the causes of corrosion in boiler tubes are explained in detail along with suggested corrective methods. Copies of the bulletin (TR-537) can be obtained free from Babcock & Wilcox Co.

—AE—

IRRIGATION AND DRAINAGE—"Construction and Maintenance of Irrigation and Drainage Systems" is the title of a six-page, profusely illustrated folder just issued by the Warner & Swasey Company. Shows the multi-purpose Gradall machine at work on a variety of spectacular irrigation and drainage projects, grading slopes, laying pipe, trenching, digging ditches with formed buckets, moving logs by use of the Gradall grapple, placing rip-rap, pouring concrete, and canal excavation. A copy of this folder may be obtained by writing to the Warner & Swasey Company, Gradall Division, Cleveland, Ohio.

—AE—

NEOPRENE NOTEBOOK — *Weathering and Sunlight Resistance*, twelfth in the "Language of Rubber" series, describes the effects of sun, atmosphere and climate on rubber, tells how exposure tests are run and interpreted by rubber technologists. Request Neoprene Notebook No. 65 from Elastomers Division, E. I. du Pont de Nemours & Co., Wilmington 98, Delaware.

—AE—

PRECISION MECHANISM — Practically the whole current technology of precision mechanism manufacture is pictorially reviewed in a publication just released by the Allied Products Division of Hamilton Watch Company of Lancaster, Pa. Entitled "Production Processing and Service Facilities," the 32-page publication reviews, in pictures, the development in tools, materials, and processes for precision manufacturing which the Hamilton Watch Company created for its own manufacturing needs, and which it now makes available to all manufacturers of precision equipment through its Allied Products Division. Treats plate processing, mass production of small precision parts, tool and die production, metals processing, and assembly and development. Ask for booklet by title from above address.

BOILER PLANT INSTRUMENTATION —New 24-page color catalog gives pertinent data on the Hays line of power plant instruments and control systems. Contains photos and schematic drawings of combustion guides; draft gages; flow, level, temperature and pressure instruments; combustion control systems; and panels. Write for Publication 55-605-83, The Hays Corporation, Michigan City, Indiana.

—AE—

CLAMSHELL BUCKETS — Practical help for clamshell bucket operators is graphically presented in a new Blaw-Knox bulletin reported to be the most comprehensive work of its kind ever issued by any bucket manufacturer. Contains 40 pages of illustrations and carefully indexed information on bucket maintenance and lubrication plus a list of common abuses leading to early bucket failure. Copies of bulletin Number 2373-R are available on request to the Bucket Department, Blaw-Knox Company, Pittsburgh 38, Pa.

—AE—

BITUMULS — New 12-page bulletin, "Bitumuls for Surface Course Mixes," describes and illustrates the uses of Bitumuls emulsified asphalt for rapid mixing with economical aggregates in the construction of durable pavements. Adaptable to all methods of mixing and may be used with all conventional equipment—blade grader, rotary tiller, traveling mix plant, central plant pug-mill (continuous or batch-type) or rotary drum mixer. Covers typical Bitumuls applications in all parts of the country. A description of Bitumuls laboratory service for proper analysis of aggregates is also included. Copies of the bulletin may be obtained by writing American Bitumuls & Asphalt Co., 200 Bush St., San Francisco 11, California.

—AE—

TITANIUM — "Facts About Titanium" contains a list of the commonly available titanium alloys and their compositions, forming and welding methods, heat treatment and machining information, as well as current and projected prices and other pertinent data. A brief comparison of titanium properties with those of a stainless steel and aluminum alloy is also included. Inquiries should be addressed to Arthur D. Little, Inc., Mechanical Engineering Division, 30 Memorial Drive, Cambridge 42, Massachusetts.

Movie . . .

THE LAST WORD IN SURVEYING INSTRUMENTS

Copies of a new film on the manufacture and use of KERN SWISS optical surveying instruments are now available on loan to engineering societies, universities, student organizations and professional groups. This film was extremely well received among top government and private engineers in Switzerland.

The beautiful photography, including some choice Swiss scenery and the English narration make this film an interesting, worthwhile experience for everybody.

Requests for the film should be mailed, well in advance of the contemplated showing date, to Kern Instruments, Inc., 120 Grant Street, White Plains, N. Y.

RUBBER JOINTS — "Joint Enterprise, a booklet describing TYLOX Rubber Joints for coupling pipe used in sewerage, drainage and other waterworks projects, is now available. Of special interest to engineers and others concerned with planning and building sewerage and drainage systems, this new brochure gives the history of the development of rubber pipe joints, and complete information and data on TYLOX. Also contains illustrated case histories of TYLOX-Jointed installations, and suggestions to assist engineers in specifying TYLOX joints for both tongue and groove, and bell and spigot pipe. Request from Hamilton Kent Manufacturing Co., 427 Grant Street, Kent, Ohio.

—AE—

CONCRETE FLOOR REPAIRS — A 7-step procedure for repairing concrete floors with new non-shrink mortar is described in a folder just released. Each step is illustrated with an actual photograph and description of the step involved. Product is called Embeco Pre-Mixed Mortar, ready-to-use and requires only mixing with water. Non-shrink mortar bonds tightly to old concrete indoors and outdoors. Folder available on request from the Master Builders Company, 7016 Euclid Avenue, Cleveland 3, Ohio.

—AE—

GAMMA RAYS — A portable gamma ray projector is the subject of a new 24-page booklet by M. W. Kellogg Company. The new projector offers a high degree of penetration yet is safe to operate, costs only a fraction as much as comparable x-ray equipment, is portable, and needs no electricity, control board or maintenance beyond replenishment of the radio-isotope. For those unfamiliar with the more general aspects of radioactivity, the booklet introduces its subject with a discussion of radio-active materials, isotopes, kinds of radiation, and "hard" and "soft" rays. Offers a simple explanation of the three gamma ray sources used with this new radiographic device—cobalt 60, cesium 37, and iridium 192—and details operation and construction features of three models presently available. Of special interest is a gamma ray intensity and film exposure guide which permits a radiographer to locate and schedule work so as to minimize the disruption of other work and predict any unsafe working areas. Copies of this booklet may be obtained from the Metal & Thermit Corporation, 100 East 42nd Street, New York 17, N. Y.

—AE—

CORROSION CONTROL—"How Zinc Controls Corrosion," a new 32 page illustrated booklet has just been published by the American Zinc Institute. Describes the many ways zinc lengthens the life of steel products, and reduces maintenance costs. Drawings, charts, and photographs together with brief comments present the corrosion control characteristics of zinc coatings, zinc pigments, and zinc anodes. An extensive selection of building, farm, industrial and marine applications of zinc is reviewed. A copy of the booklet may be obtained without charge, from the American Zinc Institute, Inc., 60 East 42nd Street, New York 17, N. Y.

Letters

(Continued from page 4)

to be designed to keep as many engineers as possible away from the registration rather than induce them to do so. As an example I would like to cite my own case.

I am a graduate of a foreign school. Therefore, I sent my credentials to the New York State Department of Education and received their recognition as being entitled to take the Engineer-in-Training exam as far as my educational background was concerned. Then, at great expense and inconvenience (I had to commute), I took a refresher course and applied for permission to take the exam.

I obtained letters of recommendation from one P.E. who was registered in New York State, my chief engineer, the assistant chief engineer and two other colleagues. (The recommendations must have been favorable as a few weeks later I was promoted to a responsible position.)

My disappointment was very great when I was refused admission to the exam solely because the registration law requires three letters of recommendation from P.E.'s registered in the State of New York, who are supposed to have known me for *at least one year*. . . . There are no P.E.'s in my company and I did not have an opportunity to meet any. . . .

It seems to me that if the NSPE wants to represent the profession as a whole it should attract the masses of engineers rather than try to run an exclusive country club, and the recommendation of one member and a few responsible citizens should be sufficient for admission to the examination.

ANATOLE E. KONSTANTIN,
Darien, Conn.

Forgotten PE's? . . .

Dear Editor:

Three cheers for Don V. Purington! (Professional Postscripts, AE, August, 1955.)

It is time that the threat of craft unionism should be felt by our complacent officers and by our members, too!

Russell M. Stephens, President of the American Federation of Technical Engineers—AFL, recently said:

> "Engineers, architects, draftsmen and related technical personnel fall under the group—skilled workers organized on a skilled craft basis—and it is an almost foregone conclusion that the organization of such classifications under the banner of the AFTE will receive impetus as a result of the merger."

Another organization, the ESA, is making great strides in signing up engineers and scientists all over the country.

No union, no bargaining unit could do a more complete job of *levelling* engineers' salaries than has already been done by the banker-controlled corporations under big business ethics. As a result of this practice, many engineers have lost their professional status and have been reduced to a status of glorified day laborers.

It is natural for big corporations to cut the cost of production and distribution of goods and services where they can. This has resulted in an artificial shortage of engineers—a good example of the operation of the law of supply and demand.

In the labor field, the use of automatic machinery, assembly lines and many other means of a highly technical nature have done much to reduce the unit cost of manufacture without reducing the number of laborers. This statement is not paradoxical in the long run as the craftsman now becomes the supervisor of an automatic machine or process, and the displaced men are used likewise on more automatic machines for increased production at lower unit cost. The craft unions are in a solid position to take care of their men in this situation, *but* the electrical, mechanical, industrial, chemical and civil engineers who invent and design automatic machinery, or create assembly line processes are entirely at the mercy of the prevailing wage level established by such groups as the manufacturers associations, electric power companies' associations, and other similar groups. . . .

Look out, engineers, the unions will get you if you don't watch out!

G. F. SARGENT, P.E.,
Chattanooga, Tenn.

Plan now to participate in National Engineers' Week!

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What's New

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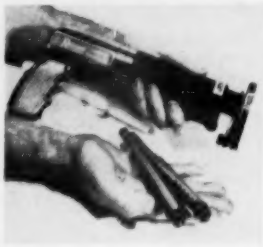
POWER-ACTUATED FASTENER — Item 1



The latest in the Ramset family of power-actuated tools, one capable of doing 90 per cent of all of the fastening jobs in ordinary construction work, is announced by Ramset, Olin Mathieson Chemical Corp. Called the Duo-Jobmaster, it comes with and operates with either a ⅜-inch barrel or a ¼-inch barrel. Permits easy change-over. Has low recoil, angle fire control and is easily maintained.

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AUTOMATIC CYCLE TIMER — Item 2

The Model Automatic Cycle Timer, by Model Machine Company, Inc., is a compact unit which is readily adaptable to any air operated equipment where consistent, accurate air cycling is required. Also contained is an auxiliary circuit for triggering electrically any outside unit i.e., hopper, selector, solenoid, etc., which may be used in conjunction with the air equipment. Can be set to supply a quantity of air for a pre-determined time interval ranging from ¼ second to 60 hours depending on model. This time cycle is consistent regardless of air pressure used. Re-adjustment of time cycle is a matter of seconds. Contains a manually reset digital counter for maintaining a constant check on production.

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BLUE PRINT RACK — Item 3

Momar Industries of Chicago has introduced a completely new Blue Print Rack, called the "Glider." One feature is its specially designed clamp which eliminates the need to punch holes in each set of prints and holds any thickness of set securely. Tightened or opened by thumbscrew adjustment and permits easy insertion or removal of prints or sets of prints. Can hold from one to one hundred sheets. No protruding ends of clamps. Each "Glider" rack can hold twelve to eighteen sets of drawings, and a clearly visible index shows the location of each set.

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DESLUDGIT, HEAVY FUEL OIL ADDITIVE — Item 4

A new additive for #4, #5, and #6 oil that features an unusual Gel Breaking Detergent Action, is being manufactured by the Stewart-Hall Chemical Corp. Named Desludgit, it is non-corrosive and non-explosive, and has a flash point of 206 degrees Fahrenheit. Desludgit is designed to break-up oil-water gels, dissolve sludge, and emulsify water in the oil. The net result of using Desludgit is that the fuel system remains clean from fuel tank to chimney, because all the oil is consumed at peak atomization efficiency. Free Desludgit demonstration kit available to perform tests and make comparisons. Return coupon for kit, and for complete information. 30 day free trial offer.

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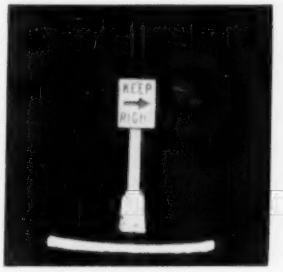
THREE IN ONE SAW — Item 5

A new, inexpensive 3 in 1 tool has been developed by Aladdin Manufacturing Company, which can turn any ¼" electric drill into a Hack Saw, a Jig Saw or a Coping Saw. Excellent for cutting metal, wood, plastic, cardboard or plaster board. Scroll and contour work can be done easily. Sturdily built and machined, with set screw to lock the blade for safety. Up to 9/16" is provided for chip clearance, and a specially designed cam reduces saw speed to ½ of drill speed.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

MINIMIZES NIGHT TRAFFIC HAZARDS — Item 6

Overall reflectorization of traffic hazards to make them brightly visible to nighttime motorists is made possible by a new reflective liquid which can be painted or sprayed directly on the surface. Called "Codit" brand reflective liquid (No. 7210), it was announced by Minnesota Mining and Manufacturing Co. Recommended for median dividers, underpass abutments and walls, culverts, safety islands, curbings, telephone poles, trees, fire hydrants, guard rails and posts and other objects where nighttime visibility means safer driving.



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OUTDOOR CONTROL for INDOOR TEMPERATURE — Item 7

General Electric Company announces the development of an automatic outdoor thermostat control which is expected to cost consumers 75 per cent less than existing automatic systems. The outdoor control tips off the indoor thermostat to changing weather conditions. This helps prevent indoor temperatures from dipping with sudden outside changes. Heart of the outdoor thermostat is a small wafer of a peculiar carbon compound that senses weather changes and then sends a minute electrical signal to the indoor thermostat. This warned, the indoor thermostat turns on the furnace to cope with lower temperatures.

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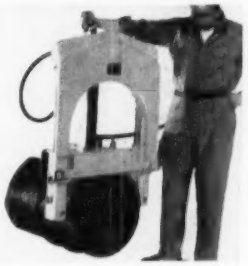
LARGE CAPACITY POWER PIPE SAW — Item 8

Big Guillotine, the New Large Capacity Power Pipe Saw cuts cast iron or steel pipe up to 16" in diameter on the job in a matter of minutes. Will cut 10", 12", 14" and 16" cast iron and steel pipe in a space only 32" wide. Double chain pipe vise clamps Guillotine Saw to pipe, ready to cut, in a matter of seconds. Machined cast steel V saddle base assures a square cut at right angle to pipe. Pipe acts as machine tool base.



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ALUMINUM IN COLORS — Item 9

Aluminum Company of America now offers a complete line of sparkling, color anodized aluminum sheet, tube, extruded shapes and fasteners in blue, green, yellow, gray, brown, gold and black metallic finishes. Shade variations of standard colors also available. Offers a myriad of design possibilities for lawn furniture, building panels and siding, automotive trim, store fronts, aluminum doors, appliances, handrails, storm windows, etc. Color finishes on aluminum are actually part of the metal itself. The crystal-clear, diamond-hard oxide coating on all aluminum is artificially built up and colored with special dye materials. This color is then "sealed-in," becoming an integral part of the metal.

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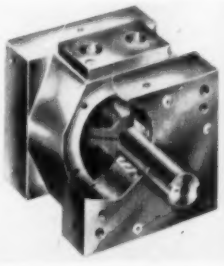
SQUARE SHAPED TORQUE MOTOR — Item 10

Announced by Roto-mation Motors, Inc., is the development of a square shaped, instant oscillating torque motor. Unit is said to be capable of obtaining up to 280° rotation, or oscillation, of a shaft to execute the following: turning, opening, closing, clamping, indexing, feeding, locking, pushing, mixing, or moving any type load or mechanism. Eliminates complex linkage, gearing, transmissions, reduction gears, racks and pinions, levers, cylinders, cams, Geneva motions and clutches. Operates on air, oil, water, or fire-resistant fluid pressure mediums.



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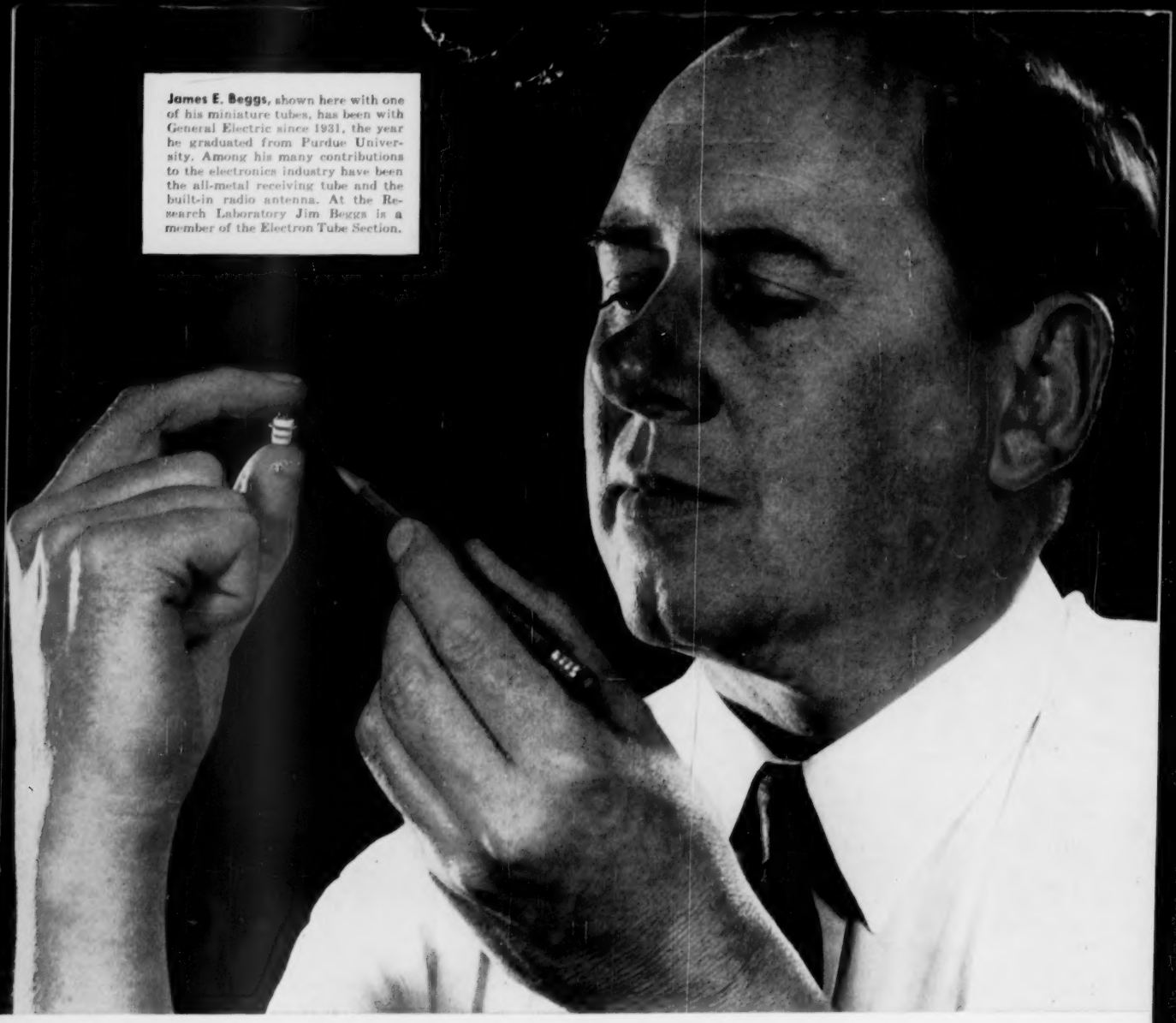

James E. Beggs, shown here with one of his miniature tubes, has been with General Electric since 1931, the year he graduated from Purdue University. Among his many contributions to the electronics industry have been the all-metal receiving tube and the built-in radio antenna. At the Research Laboratory Jim Beggs is a member of the Electron Tube Section.

Revolutionary vacuum tubes

James E. Beggs of the G-E Research Laboratory combines new knowledge with new materials and new processes

Jim Beggs has a unique talent for employing research results from many scientific fields to produce ingenious new vacuum-tube concepts and designs. Most recently, the man who 23 years ago demonstrated the first practical all-metal tube has pioneered what will certainly become a long line of microminiature ceramic vacuum tubes. The G-E Tube Department's first production version is the 6BY4 triode, which promises to bring UHF television within the range of many heretofore "televisionless" homes.

Beggs' tubes are no bigger than a shirt stud, but they will be invaluable to both industry and defense because of their low-noise and high-gain characteristics, usefulness at microwave frequencies, ability to operate while red hot, and unusual ruggedness. To achieve this revolution in the vacuum-tube art, Beggs coupled his own ingenuity in designing tubes with the work of other G-E scientists — new fundamental knowledge about titanium, new insulating ceramic materials with special expansion characteristics, and new processes for sealing metals to ceramics.

Progress Is Our Most Important Product

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